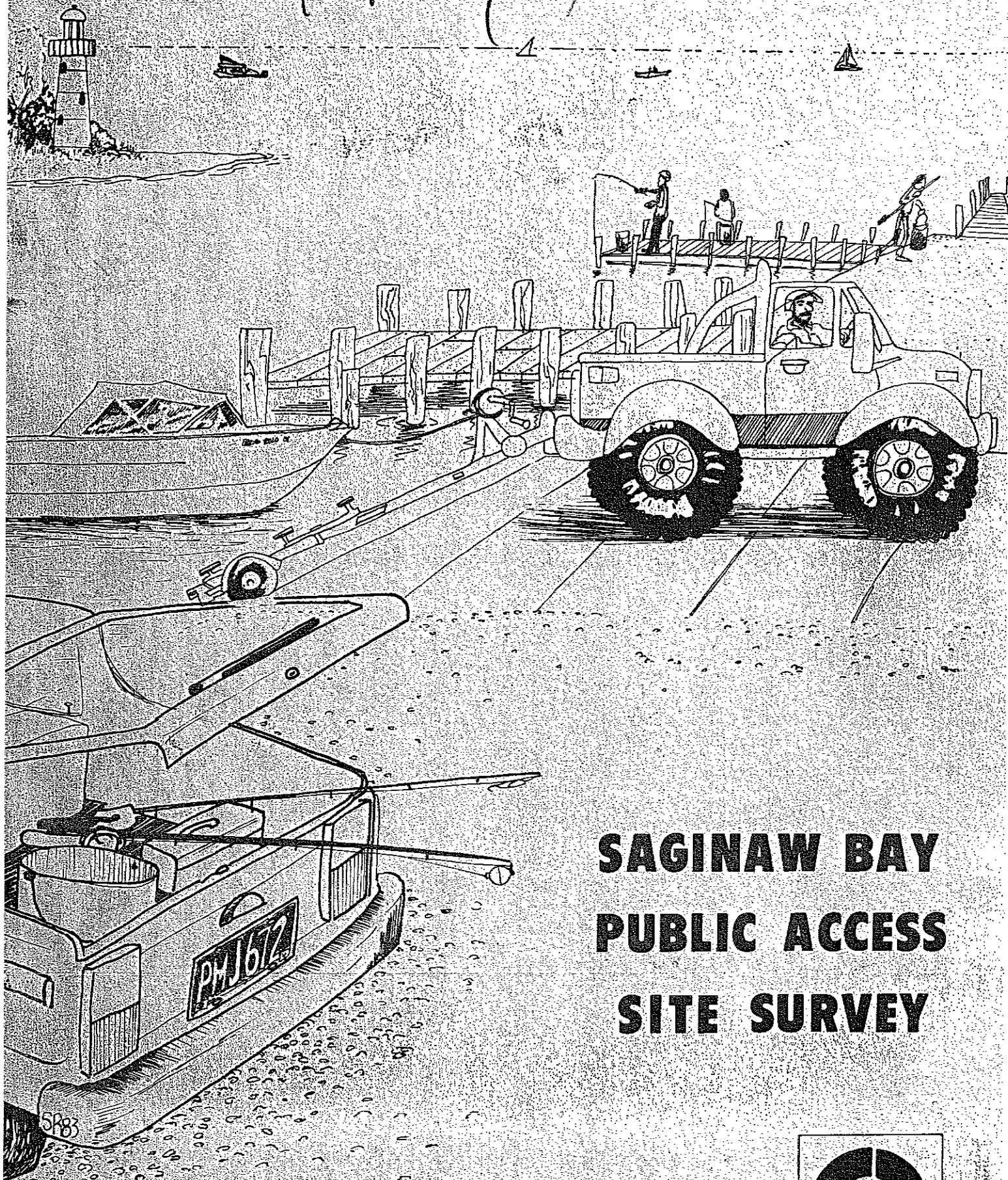


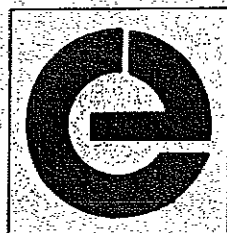
Bay Stanley

file "Saginaw Bay"



SAGINAW BAY PUBLIC ACCESS SITE SURVEY

EAST CENTRAL MICHIGAN PLANNING AND DEVELOPMENT
500 FEDERAL AVENUE SAGINAW, MICHIGAN 48606



CLEAR ORDER
517-797-0800

CURRENT CONDITION OF SAGINAW BAY PUBLIC ACCESS SITES
AND IMPROVEMENTS NEEDED BASED ON PRESENT USER ACTIVITY
AND ANTICIPATED FUTURE DEMAND

by

Greg W. Goudy

and

William L. Yocum

December 13, 1982

East Central Michigan Planning and Development Region

David Wm. Gay
Executive Director

for

Michigan Department of Natural Resources
Land Resources Division
Coastal Zone Management Program

ACKNOWLEDGEMENTS

We would like to thank the following people for their assistance on this project: Charles Kotz, Sue Fortune, Don Platt, and Shelly Rajewski of Region staff; Bob Peter of the Huron Intermediate School District and Dawn Ellison of Region 7B Employment and Training Consortium for their cooperation and administration of the Youth Employment Program personnel who served as field survey clerks; Scott Jordan of Michigan State University for providing us with additional field personnel to conduct the interviews in Bay County; the field survey clerks - particularly Dave Richardson and Robert Buschlen; Leo Mroziński and Bill Deephouse, Michigan Department of Natural Resources District Fisheries Biologists for their encouragement and support; and special thanks to James Ryckman and the staff of the Institute for Fisheries Research, Michigan Department of Natural Resources, for their assistance in data processing.

TABLE OF CONTENTS

	<u>Page</u>
Acknowledgements	i
List of Tables	iii
List of Figures	iv
Introduction	1
Saginaw Bay Area Summary	7
Area Summaries by County	20
Huron County	20
Tuscola County	24
Bay County	28
Arenac County	33
Individual Site Summaries	38
Grindstone City	38
Port Austin	39
Oak Beach	41
Caseville	42
Filion Road	44
Fin and Feather	45
Sumac Island	46
Sebewaing	48
Allen Drain	49
Tietz Drain	50
Ouanicassée	51
Smith Park/Essexville	52
Veterans Park	54
Linwood	55
Coggins Drain	56
Piaconing	57
Pine River	59
Au Gres	60
Conclusion	62
Public Participation	70
Preliminary Engineering	71
Literature Cited	72
Appendix A	73

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Percent of interviews obtained from each month for each site	8
2	Percent of interviews on weekends and percent of each month's interviews obtained on weekends for each site.....	9
3	Type of activity conducted by site users on the day interviewed for each site	10
4	Percent of interviews obtained on weekends for each activity type at each site	11
5	Miles traveled by site users to reach each site.....	14
6	Length in feet of boats launched at each site.....	16
7	Motor horsepower of boats launched at each site.....	17

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1	Saginaw Bay public access sites surveyed.....	4
2	Questionnaire returned by mail or asked of each person interviewed at Saginaw Bay public access sites.....	5
3	Michigan counties of origin of all Saginaw Bay public access site users interviewed.....	12
4	Michigan counties of origin of all Saginaw Bay public access site users interviewed in Huron County.....	21
5	Michigan counties of origin of all Saginaw Bay public access site users interviewed in Tuscola County.....	25
6	Michigan counties of origin of all Saginaw Bay public access site users interviewed in Bay County	29
7	Michigan counties of origin of all Saginaw Bay public access site users interviewed in Arenac County.....	34

CURRENT CONDITION OF SAGINAW BAY PUBLIC ACCESS SITES AND
IMPROVEMENTS NEEDED BASED ON PRESENT USER ACTIVITY
AND ANTICIPATED FUTURE DEMAND

INTRODUCTION

This survey was conducted in order to assess the current condition of public access sites around Saginaw Bay and to determine where and what improvements should be made to meet increased user demand. Higher user activity in the future is predicted on the basis of three premises - significant improvements in Saginaw Bay water quality since the early 1970's, a recovery of the walleye fisheries populations, and the continuing increase in the number of registered watercraft and fishing license holders in Michigan.

Significant reductions in phosphorus loadings to Saginaw Bay (on the order of 50% since 1974), due to the phosphate detergent ban and improvements in municipal wastewater treatment facilities, have resulted in appreciable improvements in water quality. Levels of algal biomass have been reduced throughout the bay and prevalent blooms of nuisance blue-green algae populations, which generated low dissolved oxygen levels, decreased water clarity, and caused taste and odor problems in many areas of the bay, have been reduced or eliminated (Stoermer, personal communication). This has produced beneficial effects on the aesthetic qualities of the bay, as well as better living conditions for most biological organisms. The improved water quality recently led the International Joint Commission to remove Saginaw Bay from a Class A area of concern with respect to eutrophication.

Historically, Saginaw Bay supported the second largest walleye fishery on the Great Lakes until the 1940's when it collapsed as a result of a series of year class failures primarily related to overharvest by commercial fishermen and poor water quality (Schneider and Leach, 1979). It is now

believed the potential for an immense walleye fishery in Saginaw Bay once again exists due to improvements in water quality and changes in commercial fishing regulations. The Michigan Department of Natural Resources (MDNR) has begun a massive walleye fingerling stocking program to rejuvenate the fishery with the assistance of local sportsman organizations. It is hoped the walleye populations in the bay will recover as successfully as those in Lake Erie, which increased 1300% from 2 million walleye in 1960 to 26 million in 1982 and now support a substantial recreational fishery. It is expected that as the walleye populations increase, Saginaw Bay will not only draw anglers who now travel to Lake Erie to fish walleye, but that this will stimulate increased fishing activity from area anglers as well.

Michigan has more registered recreational watercraft (620,000) than any other state and this number continues to increase at an annual rate of 1.5 percent (MDNR Natural Resources Register, May 1982). There has been a similar increase in the number of paid license holders (currently 1.5 million) of 1.3% annually over the past 10 years (Sport Fishing Institute Bulletin, June 1982). At the present rate of increase for watercraft and anglers, it has been estimated that it will take expenditures of \$145 million by 1989 on public boat launching facilities and moorages in Michigan simply to meet boating demand at the same level as is currently provided (MDNR Natural Resources Register, May 1982).

These three factors - improved water quality, a more numerous walleye population, and an increasing number of aquatic recreationists - make it very likely that there will be greater demand for Saginaw Bay public access facilities in the future. This survey was undertaken in an attempt to document that demand and to provide the basis on which plans for meeting the demand can be formulated.

A total of 18 public access sites were surveyed in the 4-county area that encloses Saginaw Bay. Eight of the sites surveyed were in Huron County, three were in Tuscola County, Bay County had five sites, and Arenac County had two (Figure 1). The survey information was generated in the form of responses to a questionnaire (Figure 2) that were either obtained by face-to-face interviews or from mailed returns of questionnaires that had been left on automobile windshields at access sites. Ten field survey clerks were stationed at various public access sites on Saginaw Bay on a 5-day-per-week random schedule for 40 hours per week from June 12, 1982 through August 23, 1982 to interview site users. The field clerk schedule was arranged so that in addition to the survey days being randomly selected, all hours from 9:00 a.m. to 9:00 p.m. on any particular survey day were randomly sampled. Each survey clerk was instructed to check each location at least once each survey day. Survey clerks varied both the length of stay and the time of day spent at each site from one day to the next so as to gather interviews in as randomized a fashion as possible. The clerks interviewed shore users (shore anglers, picnickers, etc.) as well as boat launch users but concentrated their efforts on those that used the boat launches. When a clerk left a site, a questionnaire, in a stamped, pre-addressed envelope, was placed on the windshield of towing vehicles with boat trailers attached. The response rate for mailed returns was 27%, well above average for mail surveys, indicating a strong interest in the survey.

Prior to deployment of the field survey clerk team, Region staff distributed questionnaires for mailed return and interviewed site users twice a week (once on a weekend day and once on a weekday) from mid-April through mid-June. Questionnaires were distributed at access sites during October and November, 1981. Questionnaire distribution by Region staff for ice fishing

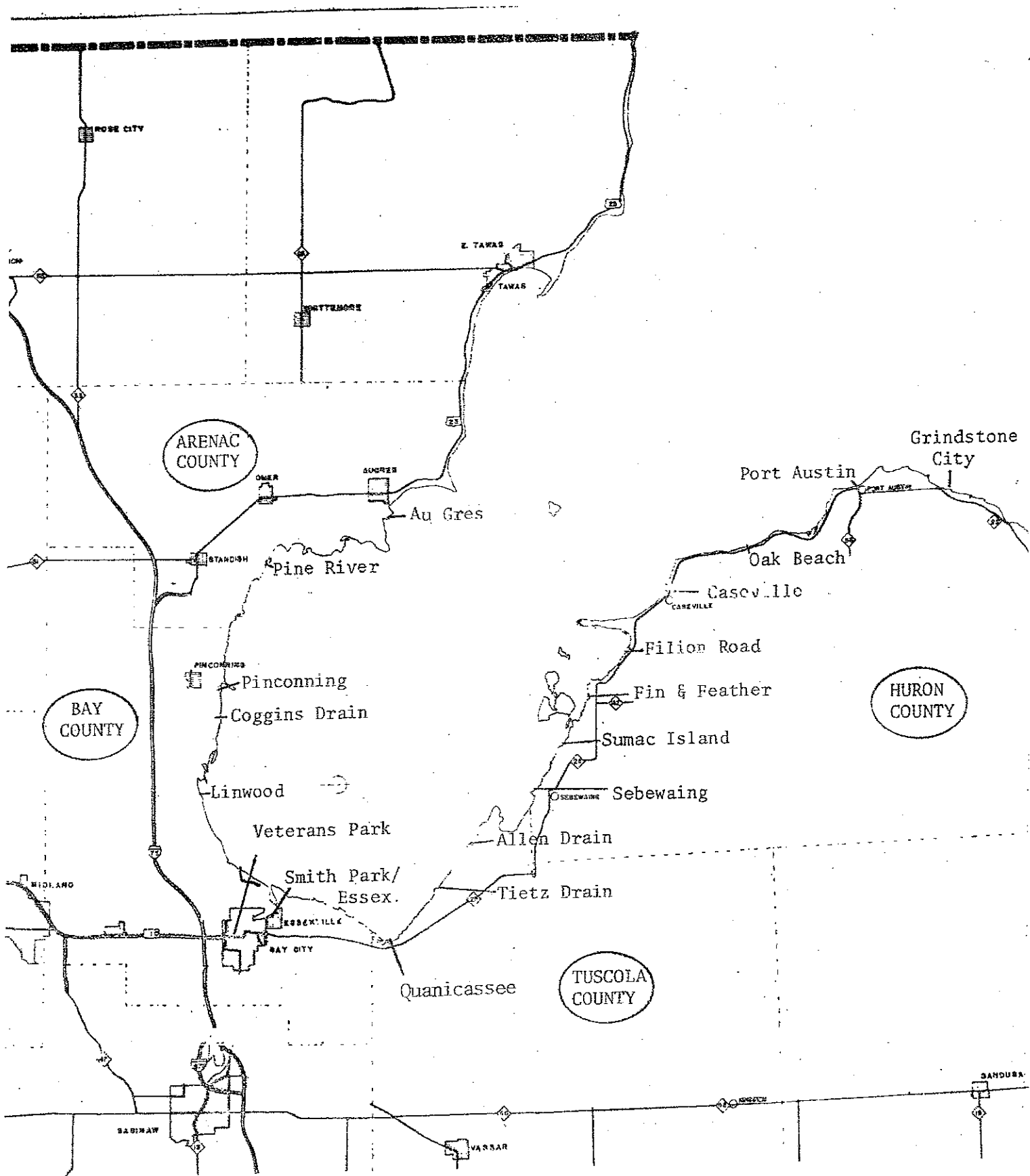
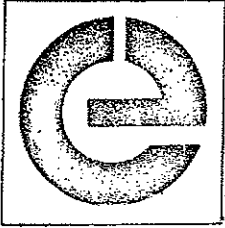


Figure 1. Saginaw Bay public access sites surveyed.



EAST CENTRAL MICHIGAN PLANNING AND DEVELOPMENT
P.O. BOX 930 • 500 FEDERAL • SAGINAW MICHIGAN 48606

COASTAL ZONE MANAGEMENT PUBLIC ACCESS QUESTIONNAIRE

No.

The East Central Michigan Planning and Development Region is conducting a survey of public access launch site users to help determine if additional sites or improvements to existing sites are needed. You can help improve access to Saginaw Bay by filling out this questionnaire and mailing it to us in the stamped addressed envelope provided. Your opinions are important to us and your response will be greatly appreciated.

Thank You Very Much.

William L. Yocum
William L. Yocum
Chief Planner

1. Which site did you use today? _____ Today's date: _____
2. Which of the following categories describe your use of this site today?

shore fishing _____
boat fishing _____
ice fishing _____
waterfowl hunting _____
recreational boating _____
other _____

3. How many times in the past 12 months have you used this site for each of the following reasons?

shore fishing _____
boat fishing _____
ice fishing _____
waterfowl hunting _____
recreational boating _____
other _____

4. Did you launch a boat here today? _____
a. Transportation method: Cartop _____ Trailer _____
b. Length of the boat:
1. Powerboat _____
2. Rowboat _____
3. Canoe or Kayak _____
4. Sailboat _____
c. Horsepower of the motor, if any:
1. Inboard _____
2. Outboard _____
3. Inboard/Outboard _____
4. No Motor _____

5. How long were you at this site today? _____
a. Time arrived _____
b. Time departed _____
6. How many other people were in your group today? _____
7. If you also used another site today, which one? _____
8. Did you or will you spend the night in the area on this trip? _____
a. Motel _____
b. Campground _____
- public _____
- private _____
c. Vacation home _____
- own _____
- rent _____
d. Stay with friends/relatives _____
9. What town/city do you live in or near? _____
10. What county do you live in? _____
11. How many miles did you drive to get here from your home? _____
12. How long did it take you to get here from your home? _____
13. Have you filled this questionnaire out before? _____ If yes, how many times? _____

ANSWER THE REMAINING QUESTIONS ONLY IF YOU HAVE NOT FILLED OUT THIS QUESTIONNAIRE AT THIS SITE BEFORE.

14. Is there anything special you like or dislike about this site? _____

15. Does this site need any improvements? _____ If so, what? _____

16. Do you think there should be more, fewer, or no change in the number of public access sites on Saginaw Bay? _____ Why? _____

17. Where would you like another site, if any? _____
_____ Why? _____

18. Do you have any other comments? _____

site users was prevented by staff vacancies during January, February, and early March. Responses from ice fishermen were obtained by mailed return questionnaires made available at bait shops located near the Bay.

The survey data from each interview was computer coded, keypunched on to computer cards, and entered into a data file. The data were analyzed by computer using the Region's micro-computer as a terminal hookup to the Michigan Interactive Data Analysis System (MIDAS) at The University of Michigan. The data were grouped into three levels for analysis starting with all the data lumped together to get a summary for the entire Saginaw Bay area. Secondly, the interviews from all sites within a specific county were combined to get a county-level analysis for each of the four counties. And finally, each site was analyzed separately.

The results of surveys of this type can be influenced by the time of year (winter versus summer), time of week (weekday versus weekend), and what activity one is using the site for (shore fishing, boat angling, ice fishing, etc.). Therefore, a breakdown of when the interviews were obtained and the percent from each user category (shore fishing, boat fishing, etc.) at each site is given in Tables 1-4. Most of the interviews came from the May-August time period with about 60% of these coming from weekends. The largest number of interviews came from boat anglers (54%) followed by shore anglers (34%) and recreational boaters (11%).

SAGINAW BAY AREA SUMMARY

From the 2,667 interviews obtained, it was found that people came to use Saginaw Bay from 45 Michigan counties (Figure 3) and several other states including some as far away as Texas and Florida though less than 1% came from out-of-state. This is almost identical to the results of a 1980 MDNR survey of 10,916 fishermen in the Michigan waters of Lake Erie where anglers were found to have come from 46 Michigan counties to fish

Table 1. Percent of interviews obtained from each month for each site.

Site	N*	Month								
		Oct	Nov	Feb	Mar	Apr	May	Jun	Jul	Aug
Saginaw Bay	2667	0.5	0.5	0.5	0.5	4	19	23	38	14
Arenac Co.	311	-	2	0.5	0.5	10	18	28	29	12
Bay Co.	841	-	-	1	1	1	26	29	32	10
Tuscola Co.	299	-	1	1	2	3	12	17	50	14
Huron Co.	1217	0.5	0.5	0.5	0.5	5	15	19	42	17
Au Gres	286	-	7	-	-	10	16	29	29	13
Pine River	25	-	-	4	-	28	32	16	20	-
Pinconning	46	-	-	-	-	-	7	22	51	20
Coggins Rd.	103	4	-	6	3	2	3	15	35	32
Linwood	64	2	-	-	3	-	11	8	48	28
Veterans Park	16	-	-	-	-	13	61	13	13	-
Smith Park/Esxv.	562	-	-	-	1	-	32	33	30	4
Quanicassee	195	-	1	1	1	4	8	15	50	20
Tietz Drain	37	-	-	-	3	3	16	38	40	-
Allen Drain	62	-	-	-	-	2	23	14	56	5
Sebewaing	119	1	1	-	-	-	11	19	47	21
Sumac Island	110	1	2	-	2	7	16	26	39	7
Fin & Feather	42	14	5	-	-	2	31	2	41	5
Filion Rd.	115	-	-	1	-	2	4	26	42	25
Caseville	367	-	-	-	1	12	19	20	37	11
Oak Beach	90	-	-	1	-	-	12	4	50	33
Port Austin	147	-	-	-	1	-	18	19	39	23
Grindstone City	217	-	-	-	1	-	10	21	50	18

* Number of site users interviewed.

Table 2. Percent of interviews obtained on weekends and percent of each month's interviews obtained on weekends for each site.

Site	N*	Total on Weekends	Month								
			Oct	Nov	Feb	Mar	Apr	May	Jun	Jul	Aug
Saginaw Bay	2667	62	-	-	100	0	0	85	55	63	56
Arenac Co.	311	66	-	-	-	0	0	100	42	81	100
Bay Co.	841	67	-	-	100	0	0	71	60	72	61
Tuscola Co.	299	69	-	-	-	-	0	100	48	71	79
Huron Co.	1217	56	-	-	100	0	0	95	55	53	41
Au Gres	286	68	-	-	-	0	0	100	44	82	100
Pine River	25	46	-	-	-	-	-	-	-	-	-
Pinconning	46	65	-	-	-	-	-	100	70	67	44
Coggins Rd.	103	57	-	-	100	0	0	100	50	51	67
Linwood	64	75	-	-	-	-	-	100	60	81	61
Veterans Park	16	75	-	-	-	-	-	-	-	-	-
Smith Park/Esxv.	562	67	-	-	-	-	-	65	63	74	57
Quanicassee	195	70	-	-	-	-	0	100	52	73	77
Tietz Drain	37	53	-	-	-	-	0	100	36	53	-
Allen Drain	62	77	-	-	-	-	0	100	56	74	100
Sebewaing	119	72	-	-	-	-	-	100	50	67	92
Sumac Island	110	49	-	-	-	-	0	28	24	39	10
Fin & Feather	42	71	-	-	-	-	0	92	100	59	50
Fillion Rd.	115	43	-	-	100	-	0	100	47	50	17
Caseville	367	54	-	-	-	-	0	97	54	52	46
Oak Beach	90	43	-	-	-	-	-	91	33	47	20
Port Austin	147	59	-	-	-	-	-	96	68	53	32
Grindstone City	217	58	-	-	-	0	-	100	64	53	42

* Number of site users interviewed

Table 3. Type of activity conducted by site users on the day interviewed for each site.

Site	N*	Activity (%)					
		Shore Fishing	Boat Fishing	Ice Fishing	Waterfowl Hunting	Recreational Boating	Other
Saginaw Bay	2667	34	54	0.1	0.1	11.3	0.5
Arenac Co.	311	41	70	-	-	8.3	0.7
Bay Co.	841	31	46	0.3	-	22.4	0.4
Tuscola Co.	299	45	46	-	-	8.3	0.7
Huron Co.	1217	36	54	-	0.1	4.3	0.6
Au Gres	286	19	72	-	-	9	1
Pine River	25	32	52	-	-	8	-
Pinconning	44	2	64	-	-	28	-
Coggins Rd.	103	24	74	1	-	1	-
Linwood	64	13	64	-	-	23	-
Veterans Park	16	19	13	-	-	62	6
Smith Park/Eskv.	562	31	42	-	-	27	-
Quailcassee	195	30	57	-	-	12	1
Tietz Drain	37	24	23	-	-	3	-
Allen Drain	62	62	26	-	-	3	2
Sebewaing	119	2	80	-	-	16	1
Sumac Island	110	33	62	-	1	1	1
Fin & Feather	42	12	79	-	-	3	3
Wilton Rd.	115	73	22	-	-	4	1
Caseville	367	42	55	-	-	3	-
Oak Beach	90	2	81	-	-	17	-
Port Austin	147	54	45	-	-	-	1
Grindstone City	217	30	67	-	-	3	-

* Number of site users interviewed

Table 4. Percent of interviews obtained on weekends for each activity type at each site.

Site	N*	Activity					
		Shore Fishing	Boat Fishing	Ice Fishing	Waterfowl Hunting	Recreational Boating	Other
Saginaw Bay	2667	51	65	100	100	75	71
Arenac Co.	311	52	67	-	-	93	100
Bay Co.	841	26	89	100	-	95	67
Tuscola Co.	99	62	77	-	-	77	100
Huron Co.	1217	42	63	-	100	64	57
Au Gres	286	55	67	-	-	96	100
Pine River	25	-	-	-	-	-	-
Pinconning	46	75	69	-	-	54	-
Coggins Rd.	103	46	61	100	-	100	-
Linwood	64	68	72	-	-	79	-
Veterans Park	16	-	-	-	-	-	-
Smith Park/Esxv.	562	60	65	-	-	78	-
Quanicassee	195	53	78	-	-	74	100
Tietz Drain	37	50	50	-	-	100	-
Allen Drain	62	81	63	-	-	100	100
Sebewaing	119	67	72	-	-	79	50
Sumac Island	110	29	67	-	-	100	0
Fin & Feather	42	60	70	-	-	100	100
Fillion Rd.	115	42	44	-	-	20	100
Caseville	367	41	62	-	-	82	-
Oak Beach	90	0	42	-	-	53	-
Port Austin	147	42	80	-	-	-	100
Grindstone City	217	42	66	-	-	33	-

* Number of site users interviewed

predominantly (71%) for walleye (Ryckman, personal communication). Sixty percent of the Saginaw Bay public access site users came from the four counties bordering the bay. Twelve percent came from the tri-county Detroit area (Wayne, Oakland, and Macomb Counties) and the remaining 18% from other counties with the number from each decreasing as its distance from the Bay increased.

The average site user drove 51 miles to get to the site and 25% drove 100 or more miles (Table 5). The mean travel time was 1.2 hours (95% Confidence Interval (CI) 1.1-1.4). People came from further away during the summer vacation months of July and August. On average there were three people in the group of each individual interviewed (generally only one person from each group was interviewed).

Twenty percent of the site users spent the night in the area in temporary accommodations with 60% of overnight use occurring on weekends. The accommodations used by overnights was broken down as follows: 34% stayed in public campgrounds, 27% in their own vacation homes, 18% with friends or relatives, 10% in motels, 7% at private campgrounds, and 4% in rented vacation homes.

Of the 2,667 site users interviewed, 54% were boat fishermen, 34% were shore anglers, and 11% were recreational boaters (Table 3). The average person had been shore fishing at that site a mean of 3.3 times (95% CI 2.9-3.7), boat fishing 6.1 times (95% CI 5.6-6.5), ice fishing 1.3 times (95% CI 1.0-1.5), waterfowl hunting 0.18 times (95% CI 0.11-0.24), recreational boating 1.4 times (95% CI 1.2-1.7), or for some other use 0.14 times (95% CI 0.054-0.23) in the past 12 months. This indicates that the people interviewed used the public access sites predominantly to launch a boat followed by shore angling and ice fishing. In fact, 52% launched a boat at the site where they were interviewed three or more times in the past

Table 5. Miles traveled by site users to reach each site.

Site	N*	Miles			Mean	95% Confidence Interval
		< 20	≥ 50	≥ 100		
Saginaw Bay	2580	16	51	25	50.7	(48.1, 53.4)
Arenac Co.	304	6	61	24	70.9	(65.8, 75.9)
Bay Co.	818	71	8	3	17.7	(14.6, 20.8)
Tuscola Co.	287	42	17	5	29.0	(25.0, 33.0)
Huron Co.	1171	8	71	36	73.9	(69.3, 78.5)
Au Gres	279	8	77	24	72.8	(67.6, 78.0)
Pine River	25	32	44	12	48.7	(30.9, 66.4)
Pinconning	45	20	18	9	30.7	(20.3, 41.1)
Coggins Rd.	99	23	11	-	26.3	(23.4, 29.3)
Linwood	62	58	6	-	18.3	(14.0, 22.5)
Veterans Park	14	63	-	-	9.7	(4.9, 14.5)
Smith Park/Esxv.	549	86	6	3	12.5	(10.5, 14.5)
Ouanicassee	189	57	11	3	22.3	(18.1, 26.5)
Tietz Drain	35	17	31	17	43.9	(25.9, 61.9)
Allen Drain	58	25	28	8	41.8	(33.3, 50.2)
Sebewaing	114	62	86	2	21.4	(16.2, 26.7)
Sumac Island	104	15	46	9	48.4	(33.6, 63.3)
Fin & Feather	38	31	44	21	59.5	(41.3, 77.7)
Fillion Rd.	29	11	62	30	78.5	(62.8, 94.2)
Caseville	354	10	73	28	77.6	(69.7, 85.6)
Oak Beach	86	18	59	41	70.2	(59.7, 80.7)
Port Austin	141	9	84	57	104.9	(86.9, 122.9)
Grindstone City	216	14	76	47	91.5	(80.0, 103.0)

* Number responding to the question

12 months and 27% had launched a boat there 10 or more times. Only 21% fished from shore three or more times and only 9% shore fished 10 times or more. Eleven percent had ice fished at the location interviewed and only 2% had hunted waterfowl there in the last 12 months.

Ninety-nine percent of the boats had been trailered to the launch site and the remaining one percent were cartopped. Ninety-five percent were powerboats, 2.5% were sailboats, 2% were rowboats, and 0.5% were canoes or kayaks. The mean boat length was 16.9 feet with 55% being 16' or less, 19% at 18' or more, and 9% being 20' or more (Table 6). Seventy-four percent were powered by outboards, 18% by inboard/outboards, and 8% by inboards. The mean motor horsepower (hp) was 79.3 (Table 7). Eleven percent were under 20 hp, 50% were less than 70 hp, 31% were over 100 hp, and 16% were 150 hp or more (Table 7).

The busiest arrival time at the sites was between 8:00 and 11:00 a.m. when 36% of the site users arrived. Sixteen percent came before eight in the morning. Seventy percent had arrived by 1:00 p.m. but only 14% had left by then. People stayed an average of 5.5 hours and the busiest departure time was between 2:00 and 5:00 p.m. when 41% departed. Twenty-five percent were still using the site after six in the evening. People arrived earlier and stayed longer in May during the spring yellow perch runs and on weekends.

In response to question 15 (Figure 2) fifty-seven percent of the site users wanted more public access sites on Saginaw Bay. Twenty-eight percent said there were enough sites but that they needed improving. This response was received more frequently at sites with shallow boat channels than at sites with deeper channels. Ten percent did not respond to the question and 4% did not know. Of those that wanted more sites, the number one reason

Table 6. Length in feet of boats launched at each site.

Site	N*	Boat Length			Mean	95% Confidence Interval
		≤ 16	≤ 18	≥ 20		
Saginaw Bay	1733	55	81	9	16.9	(16.7, 17.0)
Arenac Co.	240	55	81	14	16.9	(16.5, 17.2)
Bay Co.	572	56	84	5	16.6	(16.4, 16.8)
Tuscola Co.	159	63	89	5	16.2	(15.9, 16.6)
Huron Co.	762	52	77	13	17.2	(17.0, 17.5)
Au Gres	227	53	81	10	16.9	(16.6, 17.3)
Pine River	13	85	85	-	15.5	(14.1, 16.8)
Pinconning	42	88	98	2	14.8	(14.3, 15.4)
Coggins Rd.	80	90	98	1	14.9	(14.6, 15.2)
Linwood	51	80	98	2	15.2	(14.6, 15.7)
Veterans Park	13	23	62	31	18.1	(16.6, 19.6)
Smith Park/Esxv.	384	43	78	14	17.2	(17.0, 17.5)
Quanicassee	133	62	88	6	16.3	(15.9, 16.7)
Tietz Drain	9	78	100	-	15.0	(14.0, 16.0)
Allen Drain	17	59	88	12	16.2	(15.2, 17.3)
Sebewaing	115	44	79	17	17.3	(16.9, 17.8)
Sumac Island	69	49	88	3	15.6	(15.1, 16.1)
Fin & Feather	34	94	100	-	15.1	(14.6, 15.7)
Fillion Rd.	31	81	97	-	15.0	(14.3, 15.7)
Caseville	206	40	71	22	17.8	(17.4, 18.2)
Oak Beach	88	78	94	2	15.8	(14.9, 16.7)
Port Austin	62	27	44	50	19.4	(18.6, 20.3)
Grindstone City	147	40	69	26	18.0	(17.5, 18.4)

* Number of boats

Table 7. Motor horsepower of boats launched at each site.

Site	N*	Motor Horsepower				Mean	95% Confidence Interval
		< 20	< 70	≥ 100	≥ 150		
Saginaw Bay	1689	11	50	31	16	79.3	(75.9, 82.6)
Arenac Co.	237	16	51	32	15	86.6	(76.2, 97.0)
Bay Co.	544	14	49	33	20	82.1	(75.4, 88.7)
Tuscola Co.	154	9	52	22	7	62.9	(55.4, 70.5)
Huron Co.	754	10	49	31	14	78.3	(73.8, 82.8)
Au Gres	226	14	49	34	16	87.8	(77.0, 98.5)
Pine River	11	31	85	8	8	62.3	(18.0, 106.5)
Pinconning	30	53	93	3	3	28.1	(16.4, 39.7)
Coggins Rd.	77	49	96	3	-	25.2	(20.1, 30.2)
Linwood	44	45	90	2	-	26.5	(18.7, 34.2)
Veterans Park	13	-	31	61	54	142.6	(94.6, 190.6)
Smith Park/Esxv.	378	10	41	40	24	102.3	(94.0, 110.5)
Quanicassee	131	18	53	21	7	67.6	(59.3, 75.8)
Tietz Drain	6	75	100	-	-	18.2	(4.9, 31.4)
Allen Drain	17	8	77	15	8	43.1	(22.4, 63.9)
Sebewaing	113	9	42	35	12	87.1	(76.6, 97.7)
Sumac Island	69	22	89	3	-	33.6	(27.1, 40.0)
Fin & Feather	36	39	92	-	-	28.5	(20.8, 36.2)
Fillion Rd.	29	34	93	4	-	32.2	(23.2, 41.2)
Caseville	204	7	41	39	17	94.4	(85.4, 103.3)
Oak Beach	83	30	80	1	1	36.4	(30.2, 42.7)
Port Austin	62	10	26	52	40	120.4	(99.8, 141.0)
Grindstone City	148	5	33	41	19	96.7	(86.9, 106.6)

* Number of motors

given (36%) was that there would then be more places to go and more variety. The second largest response (29%) was that with more sites there would more of a chance of getting away from the crowds at the other sites.

The place mentioned most often for the addition of another site was between Caseville and Port Austin in Huron County (21%). The next preferred location was the Bay City area in Bay County followed by some place between Au Gres and Tawas in Arenac County. When the bay shoreline was divided into regions, 34% requested a site on the east side north of Sebewaing, 23% on the west side north of Pinconning, and 43% in the southern section between Sebewaing and Pinconning.

There were three major responses as to why someone preferred an additional site in a particular location. Twenty-nine percent said there was a need for more or better access in that area, 29% said it was a good fishing area that needed access, and 24% said it would provide them with a usable boat ramp closer to their home or vacation cottage.

When asked if there was anything in particular they liked or disliked about the site only 38% mentioned that they disliked something. More boaters had negative comments (41%) than did shore anglers (31%). But when asked if the site needed any improvements, 59% responded affirmatively. Of those that mentioned specific improvements, the largest group (34%) wanted improvements made on the size of the site including parking facilities and the number of boat launches. The second largest request (19%) was that the channel be dredged. More complaints and requests for improvements about inadequate site size were received in May and on weekends. Whereas the most common complaints from boaters dealt with either better or more launches or dredging the channel, the most prevalent concerns of shore anglers were the condition or absence of rest rooms and site maintenance.

Additional improvement requests that were received included the following: picnic tables at the site, pumps or water faucets for drinking water, better insect control, landscaping with more trees and shrubs, night lighting for parking areas and the end of the channel, channel markers, stocking more fish, better or more docks, camping facilities, and improving the access road.

Favorable comments mentioned included the following: good fishing area, good boat ramp, good location, like the site in general, like maintenance, close to home or cottage, like deep channel, like docks, like restrooms, and like the aesthetics or peacefulness of the sites.

In response to whether or not they had any other comments to make, the most common answer (other than no) was that somebody dredge or improve the other sites around the bay (22%).

AREA SUMMARIES BY COUNTY

Huron County

Huron County drew users of Saginaw Bay public access sites from more Michigan counties (35) than any of the other three counties bordering the bay (Figure 4). However, Huron County also has more public access sites on Saginaw Bay (8) than any other county. The sites surveyed in Huron County were Sebawaing, Sumac Island, Fin and Feather, Fillion Road, Caseville, Oak Beach, Port Austin, and Grindstone City (Figure 1). Forty-one percent of the 1,217 site users interviewed came from the local area of Huron (23%), Tuscola (16%), and Sanilac (2%) counties. The next largest group came from the 3-county Bay City-Saginaw-Flint area (27%). Twenty-three percent journeyed from the tri-county Detroit area of Wayne, Oakland, and Macomb counties. The remaining 9% arrived from the other counties with the number from each decreasing as its distance from the bay increased. There was a slightly greater portion (5% greater) of non-local anglers on weekends.

The average Huron County site user drove 74 miles, similar to the mean of 71 miles for Arenac County but significantly greater than the 18 and 29 mile means for Bay and Tuscola counties respectively (Table 5). Thirty-six percent of the Huron County site users drove 100 or more miles while only 8% drove less than twenty miles. The mean travel time to the site was 1.8 hours (95% CI 1.5-2.0) with 44% spending two or more hours on the road to get to the site and 13% taking three or more hours. There was an average of three people in each group interviewed and they came from further away in July and August.

Thirty-four percent of the people interviewed in Huron County spent the night in the area somewhere other than their own home with 55% of overnight

use occurring on weekends. Thirty-one percent of those that spent the night stayed at public campgrounds, 28% in their own vacation homes, 18% with relatives or friends, 11% in motels, 7% at private campgrounds, and 5% in rented vacation homes.

Fifty-nine percent of the Huron County site users interviewed were boat fishermen, 36% were shore anglers, and 4% were recreational boaters (Table 3). From this composite of 1,217 site users, the average person was found to have used the site where interviewed a mean of 3.0 times (95% CI 2.5-3.5) for shore angling, 7.1 times (95% CI 6.3-7.9) for boat fishing, 1.3 times (95% CI 0.95-1.7) for ice fishing, 0.24 times (95% CI 0.12-0.37) for waterfowl hunting, 0.80 times (95% CI 0.59-1.0) for recreational boating, and 0.23 (95% CI 0.052-0.42) for some other reason in the past twelve months. Fifty-one percent had launched a boat at least three times in the past 12 months at the site where interviewed and 36% had launched a boat 10 times or more indicating a large amount of repeat use by boaters. Though 56% had not fished from shore at the site where interviewed, 21% had done so three or more times and 9% at least 10 times in the past year. Twelve percent had ice fished at the location where interviewed and only 3% had hunted waterfowl there within the prior 12 months.

Ninety-nine percent of the boats had been trailered to the Huron County launch sites and the remaining one percent were cartopped. Ninety-six percent were powerboats, 2% were rowboats, 1.5% were sailboats, and 0.5% were canoes or kayaks. The mean boat length was 17.2 feet - the largest mean boat length for any of the four bay counties (Table 6). Fifty-two percent of the launched boats were 16' in length or less, 23% were 18' or more, and 13% were greater than or equal to 20 feet (Table 6). Seventy-four percent were powered by outboard motors, 21% by inboard/outboards, and 5% by inboards.

The mean motor horsepower was 78.3 (Table 7). Ten percent were under 20 hp, 49% were less than 70 hp, 31% were 100 hp or larger, and 14% were 150 hp or more (Table 7).

The busiest arrival time at the Huron County sites was between 8:00 and 11:00 a.m. when 33% of the site users arrived. By eight in the morning, 22% had arrived. Eighty-one percent had come by 1:00 p.m. but only 12% had gone by then. People stayed an average of 6.0 hours and the busiest departure time was between 2:00 and 5:00 p.m. when 40% departed. Twenty-nine percent were still using the site after six in the evening. People arrived earlier and stayed longer in May during the yellow perch runs and on weekends.

Fifty-four percent of those interviewed at Huron County sites said they would like more public access sites on Saginaw Bay. Thirty-three percent felt there were enough sites but that they needed improving. Nine percent did not respond to the question and 3% did not know. The two major reasons given for wanting more sites were that this would provide more places to go (36%) and give one a better chance at getting away from the crowds at the other sites (30%).

The location mentioned most often in response to where the Huron County site interviewee would prefer an additional access site was the area between Caseville and Port Austin (42%). The next most common area mentioned was that between Au Gres and Tawas in Arenac County (17%). When the bay shoreline was divided into regions, 61% requested an additional site for somewhere in Huron County, 24% on the west side north of Pinconning, and 15% in the southern area between Pinconning and Sebewaing.

When asked why they preferred an additional site in the particular location given by them, 30% of those responding to the question said it was because there was a need for more or better access in that area. Twenty-six

percent said it would put them closer to a good fishing area, and 17% mentioned it would provide them with a site closer to their home or vacation cottage.

When asked if there was anything in particular they liked or disliked about the site, only 37% mentioned a dislike. Forty-three percent of the boaters had negative comments but only 26% of the shore anglers disliked something. However, when asked if the site needed any improvements, 57% said that it did. Thirty-seven percent wanted improvements made on the launch or docks. Thirty-five percent said the site needed enlarging in terms of more parking area, more boat launching ramps, or both. The last major category of improvement requests was that the site be dredged (19%). Requests for enlarging the site were three times more numerous in May than any other month and twice as great on weekends versus weekdays.

Of those that had other comments to make at the end of the questionnaire, the comment made most often was that the other sites around the bay should be dredged and improved.

Tuscola County

People came to Saginaw Bay public access sites in Tuscola County from 22 Michigan counties (Figure 5). The three sites in Tuscola County where interviews were obtained were Ouanicasse, Tietz Drain, and Allen Drain (Figure 1). Thirty-two percent of the 299 site users interviewed had come from Tuscola County. The tri-county area (Bay, Saginaw, and Genesee) containing Bay City, Saginaw, and Flint provided another 59 percent. The remaining 9% came from the other 18 counties with the number from each decreasing as its distance from the Bay increased.

The average site user drove only 29 miles to reach a Tuscola County

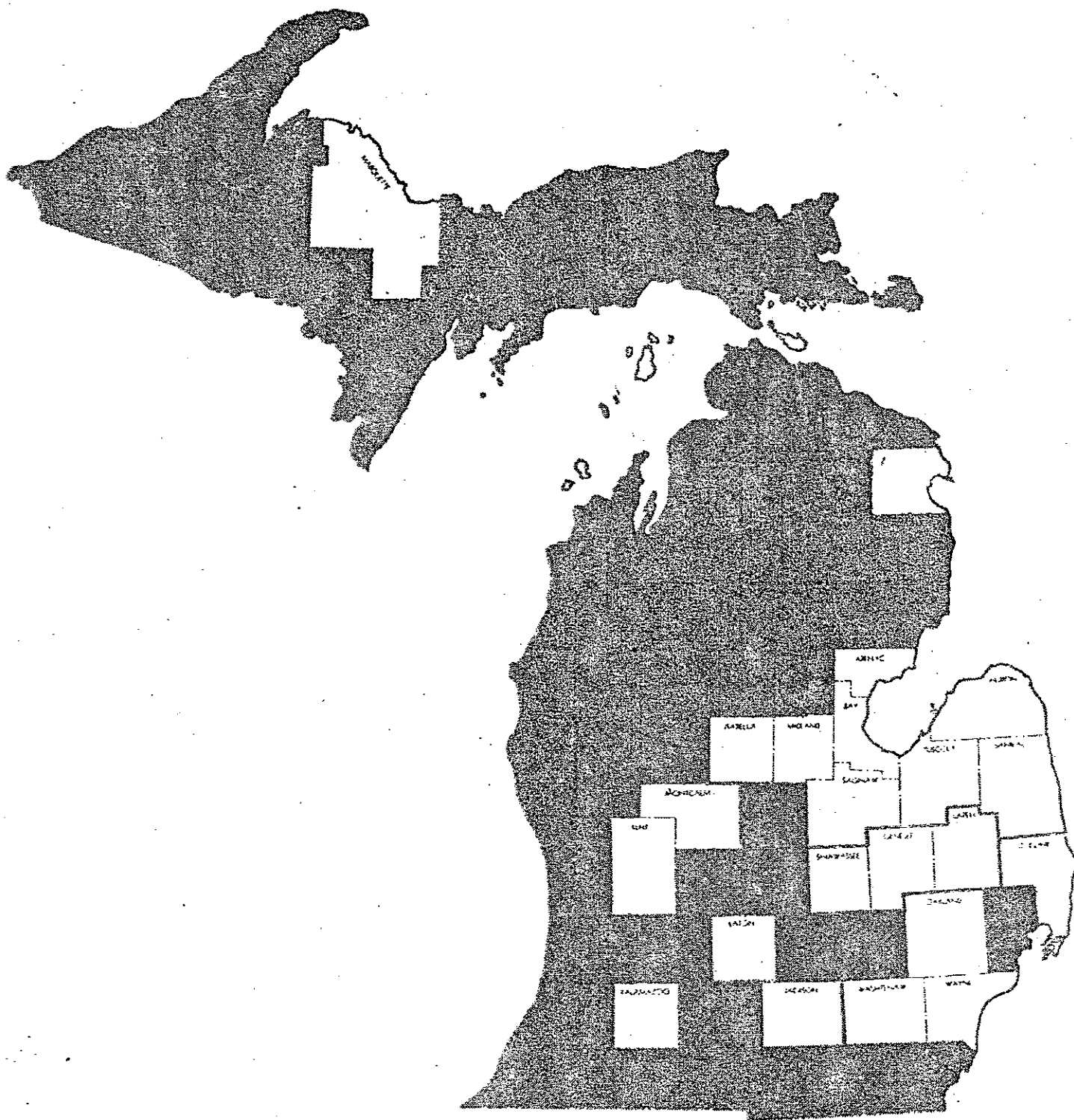


Figure 5. Michigan counties of origin of Saginaw Bay public access site users interviewed in Tuscola County.

site and just a few (5%) drove over 100 miles (Table 5). This was much less than both the Saginaw Bay area mean of 51 miles and the proportion that drove 100 or more miles (25%) to get to a site in the 4-county bay region. The mean travel time to a site in Tuscola County was 38 minutes (95% CI 33.5-43.2) and 69% spent less than an hour on the road to get there. There was an average of three people in each group interviewed and they came from a greater distance in June.

Only 7% spent the night in the area compared to a bay-wide average of 20 percent. Fifty-five percent of the temporary overnight use occurred on weekends. The facilities used as transient accommodations were public campgrounds (46%), owned vacation homes (27%), friends or relative's home (23%), and motels (4%).

Forty-six percent of the people interviewed in Tuscola County were boat fishermen, 45% were shore anglers, and 9% were recreational boaters (Table 3). Among the composite of 299 site users, the average person had used the site where interviewed a mean of 4.4 times (95% CI 3.1-5.7) for shore fishing, 5.0 times (95% CI 4.0-6.0) for boat angling, 1.0 times (95% CI 0.50-1.60) for ice fishing, 0.24 times (95% CI 0.079-0.400) for waterfowl hunting, 0.80 times (95% CI 0.59-1.00) for recreational boating, and 0.23 times (95% CI 0.052-0.420) for some other activity such as picnicing, during the past 12 months. Fifty-one percent had launched a boat at least three times in the last year at the site where interviewed and 27% had launched a boat 10 or more times. Only 49% had not fished from shore at the site and 29% had done so three or more times. Eleven percent had ice fished at the location where interviewed and 4% had hunted waterfowl there within the last 12 months.

Ninety-eight percent of the boats had been trailered to the Tuscola County launch sites with the remaining two percent having been cartopped.

Ninety-five percent were powerboats, 2.4% were rowboats, 1.2% were sailboats, and 1.2% were canoes or kayaks. The mean boat length, at 16.2 feet, was the smallest of the four counties surveyed (Table 6). Sixty-three percent of the launched boats were 16' or less in length and 89% were 18' or less (Table 6). Only 5% were 20' long or longer. Most of the boats were powered by outboards (82%), followed by inboard/outboards (12%), and inboards (6%). The 62.9 mean horsepower of the motors was also the smallest of the four surveyed counties (Table 7). Nine percent of the motors were under 20 hp, 52% were smaller than 70 hp, 78% were less than 100 hp, and only 7% were larger than 150 hp (Table 7).

The largest influx of people at the Tuscola County sites occurred between 9:00 a.m. and noon when 32% of the daily site users arrived. People tended to arrive later but then leave later at Tuscola County sites than they did in the other three counties. Only 7% had arrived by 8:00 a.m. in Tuscola County versus 22% in Huron County. Though the largest number of people departed between 2:00 and 5:00 p.m. (44%) as was found to be the case in the other counties as well, 34% still remained at the site after 6:00 p.m. versus a bay-wide average of 25 percent. Additionally, people stayed an average of only 4.2 hours, the least amount of time for any of the four counties.

Fifty-four percent of the Tuscola County site users interviewed thought there should be more public access sites on Saginaw Bay. The two major reasons given for wanting more sites were so there would be more places to go (35%) and so the crowds at each individual site would be less (20%). Another 21% responded that no new sites need to be added but that the ones that are there currently should be improved. Fifteen percent did not answer the question and 9% did not have an opinion.

Of those people who mentioned a particular location for a new site, the

greatest percentage (21%) wanted one in Tuscola County. On a region basis, 23% wanted a new site on the west side of the bay north of Pinconning, another 23% would prefer one on the east side north of Sebewaing, but most (54%) wanted a site in the southern portion between Pinconning and Sebewaing. Thirty percent chose the area they did because it was a good fishing area that they would like better access to. Twenty-five percent said their favored area would be closer to their home or vacation cottage. Nineteen percent said that the area they specified simply needed more access.

Only 11% of those interviewed at Tuscola County public access sites originally mentioned that they disliked something about the site but when asked if the site needed any improvements 44% said that it did (41% of shore anglers and 44% of boat fishermen). Of those that wanted improvements made, 41% would like to see the site enlarged in terms of more parking (13%) and more boat launching ramps (28%). Twenty-five percent said the channel should be dredged and another 25% wanted more or improved docks. Twice as many requests, in proportion to the others, were received for more or bigger ramps in July and August and on weekends. Of those that had other comments to make at the end of the interview, the largest single category of response (24%) was that other sites around the bay be dredged and improved.

Bay County

People were interviewed at five public access sites in Bay County. These sites included Pinconning, Coggins Road, Linwood, Veterans Memorial Park in Bay City, and Smith Park in Essexville (Figure 1). The 841 site users interviewed were found to have come from 14 Michigan counties (Figure 6). Seventy-six percent had come from Bay County, 14% from the

Saginaw-Flint two-county area and 4% from the tri-county Detroit area of Wayne, Oakland, and Macomb counties. The remaining 6% came from the other eight counties.

The average site user drove only 18 miles to reach a Bay County site and only 6% traveled from 100 or more miles away (Table 5). The 18 mile mean for Bay County was well below the 74 and 71 mile averages for Huron and Arenac counties respectively and lower than the 29 mile mean for Tuscola County as well. It took the average site user only 31 minutes (95% CI 22-38) to reach the site versus a bay-wide mean of one hour and 18 minutes. There was an average of three people in each group interviewed and they came from further away in May and July.

Only 2% spent the night in the area at transient accommodations versus 34% of Huron County site users, 25% of those at Arenac County sites, and 7% of the people interviewed in Tuscola County. Seventy-eight percent of the overnight use in Bay County occurred on weekends. Of the 2% that spent the night, 37% stayed in public campgrounds, 32% with relatives or friends, 16% in their own vacation homes, 10% at private campgrounds, and 5% in motels.

Forty-six percent of the Bay County site users interviewed were boat anglers, 31% were shore fishermen, and 23% were recreational boaters (Table 3). The responses of the 841 people interviewed showed that the average person had been shore fishing at the site where interviewed 3.9 times (95% CI 3.1-4.8), boat angling 5.1 times (95% CI 4.3-5.9), ice fishing 1.4 times (95% CI 0.92-1.80), waterfowl hunting 0.13 times (95% CI 0.045-0.21), recreational boating 2.6 times (95% CI 2.0-3.1), or for some miscellaneous reason 0.03 times (95% CI 0.0048-0.0570) during the past year. Fifty-three percent had launched a boat three or more times at the location where interviewed in the prior 12 months and 28% had launched a boat at least 10

times. Sixty-seven percent of those interviewed had never shore fished at that site in the last year but 22% had done so three times or more and 10% had a minimum of 10 times. Eleven percent had ice fished at the site where interviewed and 2% had hunted waterfowl from there within the previous 12 months.

All the boats launched at the Bay County sites had been trailered, none had been cartopped. Ninety-two percent were powerboats, 4% were sailboats, 3% were rowboats, and 1% were canoes or kayaks. The mean boat length was 16.6 feet (Table 6). Fifty-six percent of the launched boats were 16' in length or less, 84% were 18' or less, and only 5% were 20' or larger (Table 6). Seventy-two percent of the boats were powered by outboard motors, 16% by inboard/outboards, and 12% by inboards. The average size of the motors was 78.9 hp (Table 7). Fourteen percent were under 20 hp, 49% were less than 70 hp, 33% were 100 hp or more, and 20% were at least 150 hp (Table 7).

Arrival times at the Bay County sites were evenly distributed between 8:00 a.m. and 1:00 p.m. with only 20% of the site users arriving after one in the afternoon. People stayed an average of 4.4 hours with 42% leaving sometime between 2:00 p.m. and five in the afternoon. Only 19% had left the site by 1:00 p.m. but by 6:00 p.m. 81% had departed. Site users arrived earlier and stayed longer in May during the yellow perch spawning runs.

Sixty-eight percent of the people interviewed in Bay County thought there should be more public access sites on Saginaw Bay. The major reasons given for wanting more sites were so there would be more places to go (39%) and so each individual site would be less crowded (37%). Twenty-four percent thought there was no need for more sites if existing sites were improved. An additional 5% did not respond to the question and 2% did not have an opinion.

Of those that specified a particular location where they would like to

have a new site, 85% said they would prefer one in the Bay City area. When the Saginaw Bay shoreline area was divided into regions, only 4% wanted a new site on the east side north of Sebewaing, 7% would like one on the west side north of Pinconning, but 89% wanted one in the southern portion between Pinconning and Sebewaing. With respect to why a person preferred a site at a particular location, the leading response (33%) was that it would be closer to their home or vacation cottage. The next most common reasons given were that it was a good fishing area (27%) or that the area mentioned simply needed more access (20%).

Thirty-four percent of the people interviewed in Bay County mentioned a specific dislike when asked if there was anything they liked or disliked about the site. However, when asked if the site needed any improvements, 74% said that it did (79% of recreational boaters, 75% of boat fishermen, and 69% of shore anglers). Requests for improvements to the boat launch and docks (34%) was the largest request category. Eighteen percent wanted the site enlarged in terms of more parking space or more launches. Thirteen percent said there was a need for restrooms or better maintenance of existing restrooms; this was the leading request of shore anglers. It also ranked high for both recreational boaters and boat fishermen falling in second place for each group after the desire for more or improved docking facilities. The proportion of complaints received about restroom facilities was twice as great in May and June. The proportion received about the site being too small in terms of parking and number of launching ramps was twice as great in June and July and three times as numerous on weekends. When asked if they had any other comments to make at the end of the interview, the most common response was the request for more patrols by law enforcement officers to curtail the excessive speed of boats in designated low speed

areas. This comment was mostly received from anglers at the Smith Park site in Essexville.

Arenac County

People were interviewed at the Au Gres and Pine River public access sites on Saginaw Bay in Arenac County (Figure 1). The 311 site users interviewed were found to have come from 28 Michigan counties (Figure 7). Twelve percent had come from Arenac County, 54% from the Bay City-Saginaw-Flint three county area, and 5% from the tri-county Detroit region of Wayne, Oakland, and Macomb counties. Twenty-nine percent came from the remaining counties with the largest share (7%) coming from Midland County.

The average site user drove 71 miles to reach an Arenac County site (Table 5). This was second only to the 74 mile mean for Huron County. Sixty-one percent drove 50 miles or more and 24% traveled over 100 miles to reach the site (Table 5). The average travel time was 1.5 hours (95% CI 1.4-1.7) with 85% of the site users taking more than an hour to get to the site. Twenty-nine percent took over two hours and twelve percent spent over three hours. Again, there was an average of three people in the group of each person interviewed and they came from slightly further away on weekends.

Twenty-five percent of the Arenac County site users spent the night in the area at temporary accommodations. This was less than the 34% that stayed overnight in Huron County but was significantly greater than the 7% and 2% figures for Tuscola and Bay counties respectively. Seventy-six percent of overnight use in Arenac County occurred on weekends. Of those that spent the night, 43% stayed in public campgrounds, 23% in their own vacation homes, 14% with relatives or friends, 9% at motels, 8% in private campgrounds, and 3% at rented vacation homes.

Seventy percent of the site users interviewed were boat anglers, 21% were shore fishermen, and 8% were recreational boaters (Table 3). The combined information from the 311 interviews showed that the average site user had used that location for shore fishing 1.5 times (95% CI 0.79-2.20), boat angling 5.7 times (95% CI 4.5-6.9), ice fishing 1.4 times (95% CI 0.26-1.50), waterfowl hunting 0.023 times (95% CI 0.005-0.050), recreational boating 1.1 times (95% CI 0.60-1.60), or for some other reason such as picnicing 0.045 times (95% CI <0-0.11) in the past 12 months. Fifty-seven percent had launched a boat at that site three or more times in the last year and 38% had launched one at least 10 times. Sixty-nine percent had not shore fished at the site and only 10% had done so three times or more. Eleven percent had ice fished at the site but only 1% had gone waterfowl hunting from that location.

Ninety-nine percent of the boats launched at the Arenac County sites had been trailered there and 1% had been cartopped. Ninety-five percent were powerboats, 3% were sailboats, 1% were rowboats, and 1% were canoes or kayaks. The mean boat length was 16.9 feet, second only to Huron County's average length of 17.2 feet (Table 6). Fifty-five percent of the launched boats were 16' or less in length, 81% were 18' or smaller, and 14% were 20' or larger (Table 6). Seventy-three percent of the boats were powered by outboard motors, 17% by inboard/outboards, and 10% by inboards. The average size of the motors was the largest of the four counties at 86.6 hp (Table 7). Sixteen percent were less than 20 hp, 51% were smaller than 70 hp, 32% were 100 hp or larger, and 15% were at least 150 hp (Table 7).

Most people arrived at the Arenac County sites earlier in the day than at any of the other three counties. Fifteen percent came before 8:00 a.m. and by 1:00 p.m. all but 13% of the site users for the day had arrived. The

busiest arrival time was from 8:00 to 11:00 a.m. when 51% arrived. People also left the sites in Arenac County earlier than at the others with the greatest percentage (51%) leaving between 1:00 p.m. and four in the afternoon. Though only 13% had departed by 1:00 p.m., all but 16% had left by six in the evening. People were at the site an average of 5.9 hours but stayed slightly longer in August. They also stayed longer on weekends with 44% of weekend site users staying six or more hours versus only 26% of weekday users remaining that long. During the week 50% of the site users had departed by 2:00 p.m. compared to only 26% of weekend users leaving by then.

Fifty-one percent of the people interviewed in Arenac County felt that there should be more public access sites on Saginaw Bay. Again, the reasons given most often for desiring more sites were that there would be more places to go (30%) and more of a chance to get away from the crowds (18%). Twenty percent thought there were enough existing sites but that they should be improved. A rather large number (21%) did not answer the question and 8% had no opinion.

The area where the largest number of people interviewed at Arenac County sites (33%) would prefer to have another site was between Au Gres and Tawas. The second largest group (21%) wanted a site between Pine River and Au Gres. When the Saginaw Bay shoreline was divided into regions, 62% of people responding to the question requested a site on the west side north of Pinconning, 31% wanted one in the southern portion of the bay between Pinconning and Sebawaing, and 7% would like one on the east side north of Sebawaing. Three categories received an equal number of responses (23%) as to why someone preferred an additional site in a particular location. That a site in the area mentioned would be closer to home was one. Another was

that it was a good fishing area, and the third was that the area needed more public access.

Forty percent of the Arenac County site users interviewed originally complained about some aspect of the site and when asked specifically if the site needed any improvements, 47% said it did. Again, a lesser proportion of shore anglers had negative comments about the site (25%) than did boat fishermen (44%). Fifty-one percent of the negative comments received dealt with the \$3.00 daily site use fee at the Au Gres site. On what improvements the site needed, the most people (35%) wanted better boat launching ramps and docks. Thirty-one percent said the site should be enlarged with either more launching ramps or more parking. Sixteen percent wanted the access road graded or paved and 8% would like the addition of a water faucet or pump to provide drinking water and a fish cleaning station. Proportionally there were three times as many complaints about too few launching ramps during weekends and in July. Of those people who desired to make other comments at the end of the questionnaire, 41% complained about the \$3.00 daily use fee at the Au Gres site.

INDIVIDUAL SITE SUMMARIES

Grindstone City

Sixty-seven percent of the 217 people interviewed at this state-owned site were boat fishermen, 30% were shore anglers, and the remaining 3% were recreational boaters (Table 3). When the number of visits to this site by each person in the last 12 months were tallied, it was found that the average person used the site 2.6 times for shore fishing, 8.0 times for boat angling, 0.31 times for ice fishing, none for waterfowl hunting, and 0.42 times for recreational boating. Forty-nine percent had launched a boat three or more times and 30% had launched one 10 times or more. Forty percent of the site users had shore fished at the site but only 18% had done so at least three times and just 7% had 10 or more times. Only 5% had ice fished at the site in the last year.

All but 1% of the boats had been trailered to the Grindstone City site. Ninety-nine percent of the boats were powerboats with sailboats making up the remaining one percent. The mean boat length for this site was 18.0 feet - second only to the Port Austin average of 19.4' for Huron County sites (Table 6). Sixty percent of the boats launched were over 16' and 26% were 20' or larger (Table 6). Sixty-six percent of the boats were powered by outboard motors, 24% by inboard/outboards, and 10% by inboards. The average motor horsepower was 96.7 - again, second only to Port Austin's mean of 120.4 hp for sites in Huron County (Table 7). Only 5% were less than 20 hp, just 33% were under 70 hp, 41% were 100 hp or more, and 19% were greater than or equal to 150 horsepower (Table 7).

People arrived at the Grindstone City site rather early with 28% of the daily site users coming before 8:00 a.m. and 51% there by 10:00 in the morning. Though they stayed an average of 6.0 hours, quite a few (34%) were

still at the site after 6:00 in the evening. As with most sites surveyed, site users tended to arrive earlier and stay longer on weekends than weekdays.

Sixty-one percent of the people interviewed at Grindstone City mentioned specific improvements they thought the site needed. Thirty-three percent of the improvement requests were for a larger site in terms of more parking (16%), more launching ramps (8%), or both (9%). Twenty-three percent wanted improvements made to the ramp or docking facilities. Eighteen percent thought the channel should be dredged. The proportion of complaints about lack of parking facilities was five times larger in May than other months.

If improvements were to be made to the Grindstone City public access site, priority should be given to enlarging the site by first increasing the parking area and then adding another launching ramp. Though having the channel dredged was mentioned as a need by many, this is probably secondary to enlarging the site as rather large boats were launched here indicating a useable channel depth, if not an optimum depth. Another significant improvement would be the placement of a foghorn at the end of the channel as was requested by 7% of those interviewed. A foghorn would be very useful at this site as it often becomes fog-bound and boaters have difficulty locating the channel from the lake.

Port Austin

Fifty-four percent of the 147 people interviewed at this public pier and adjacent private ramp were shore fishermen and 45% were boat anglers (Table 3). The average person at this site had used it 3.8 times for shore fishing, 8.3 times for boat angling, 0.22 times for ice fishing, none for

waterfowl hunting, 0.075 times for recreational boating, and 0.61 times for miscellaneous reasons such as picnicing in the last 12 months. Though only 35% had launched a boat three times or more, 22% had done so at least 10 times. Twenty-two percent had been shore fishing three or more times and 8% had been shore fishing there more than 10 times. Only 1% had gone ice fishing from this site and none had used it for waterfowl hunting.

All the boats had been trailered to the Port Austin launch site. Ninety-six percent were powerboats, 3% were rowboats, and 1% were canoes or kayaks. The mean length of 19.4 feet for boats launched at this site was the largest average for all the sites surveyed (Table 6). Only 27% were 16' or less, just 44% were 18' or smaller, and 50% were 20' or more (Table 6). However, this site had only the second largest mean motor horsepower at 120.4 hp (motors averaged 142.6 hp at Veterans Park in Bay County) (Table 7). Ten percent of the motors were smaller than 20 hp, 26% were under 70 hp, 52% were 100 hp or more, and 40% were 150 hp or larger (Table 7). Only 49% of the people interviewed thought this site needed any improvements. The improvement requests were equally divided between those that wanted the site enlarged (47%) and those that wanted the launching and docking facilities improved (47%). The proportion of complaints about the size of the site quadrupled in May and on weekends.

The planned construction of public launching ramps and more parking facilities by the MDNR should do much to alleviate the present crowded conditions and provide improved launching facilities. No further recommendations for improving this site are made at this time.

Consideration should be given to replacement of the portion of sand beach lost to the construction of dual ramps and access drive. One pair of ramps may not be sufficient to handle peak demand during the salmon and

trout fishing season, particularly early in the morning and following sudden storms or fog. Future surveys should be conducted to assess potential need for more ramps at this location.

Oak Beach

Eighty-one percent of the 90 people interviewed at this county-owned site were boat anglers, 17% were recreational boaters, and only 2% were shore fishermen (Table 3). The average person at the Oak Beach site had used it for shore fishing 0.07 times, boat angling 14.5 times, ice fishing 2.2 times, none for waterfowl hunting, and 2.5 times for recreational boating in the last 12 months. Eighty-nine percent had launched a boat three times or more and 58% had launched one at least 10 times. Only 3% had shore fished at the site and none more than twice. Thirteen percent had been ice fishing there.

All the boats had been trailered to the Oak Beach site. Ninety-one percent were powerboats, 6% were sailboats, and 3% were rowboats. The mean boat length was 15.8 feet (Table 6). Seventy-eight percent of the boats launched were 16' or smaller, 94% were under 18', and only 2% were equal to or greater than 20 feet (Table 6). Ninety-seven percent of the boats were powered by outboard motors, 2% by inboards, and 1% by inboard/outboards. The average motor horsepower was only 36.4 with 30% less than 20 hp, 80% under 70 hp, and only 1% being 100 hp or more (Table 7).

Ninety-six percent of the people interviewed at the Oak Beach site thought that improvements needed to be made. Fifty-two percent said that improvements should be made to the launching facility in terms of a better ramp or providing a dock at the ramp. Thirty percent said the channel needed dredging and 24% wanted the site enlarged.

Currently, this site is completely exposed to wave action from the bay. This causes two major problems. First, the wave action continually shifts sand around the site area covering the steel mat that is presently used at the site. Second, the wave action at the site makes launching and retrieving a boat difficult most of the time and extremely hazardous on rough days. No improvements should be made to this site unless breakwalls are constructed to prevent sand from covering the ramp and filling in a channel. If breakwalls were constructed, a channel could be dredged and a permanent launch and dock installed. This site would be relatively expensive to improve in such a way that it would provide acceptable boat launching conditions from a safety standpoint.

The exposed nature of the shoreline of this area is a major reason no other public access sites exist in the region. However, because there are no good public boat launching facilities here and the close proximity of productive fishing grounds, this was the area mentioned most often by Saginaw Bay public access site users as the place where they would most like to have a new site constructed (21% of all those interviewed and 42% of those surveyed in Huron County). We believe there is a definite need for a safe public access site in this area and strongly urge the construction of an adequately protected launch site midway between Caseville and Port Austin. A potential site exists at the mouth of the Pinnebog River.

Caseville

Fifty-five percent of the 367 people interviewed at this township-owned site were boat fishermen, 42% were shore anglers (fishing from the pier), and 3% were recreational boaters (Table 3). This site was by far the most heavily used public access facility on the eastern side of the bay. The

average site user had used this site 4.3 times for shore fishing, 4.7 times for boat angling, 1.3 times for ice fishing, none for waterfowl hunting, and 0.46 times for recreational boating in the last year. Forty-four percent had launched a boat at the site three times or more and 21% had done so at least 10 times. Twenty-six percent had been shore fishing a minimum of three times and 13% had been shore fishing over 10 times. Thirteen percent had gone ice fishing at the site.

All the boats had been trailered to the Caseville launch site and all were powerboats. The average boat length was 17.8 feet - third largest for Huron County sites behind Port Austin and Grindstone City (Table 6). Forty percent of the boats were 16' or smaller, 29% were 18' or longer, and 22% were at least 20' long (Table 6). Sixty-eight percent of the boats were powered by outboard motors, 28% by inboard/outboards, and 4% by inboards. The mean motor horsepower was 94.4 with only 7% less than 20 hp (Table 7). Forty-one percent were under 70 hp, 39% were 100 hp or more, and 17% were greater than or equal to 150 horsepower (Table 7).

Forty-nine percent of the people interviewed at the Caseville site wanted improvements made. The largest group (57%) said the site needed enlarging in terms of more boat launching ramps (29%), more parking area (18%), or both (10%). Twenty percent wanted improvements made to the launching ramp or the ramp dock. Fourteen percent complained about the lack of adequate restroom facilities. Complaints about there not being enough boat launches were proportionally six times greater in May and three times greater on weekends compared to other times. Requests for making the site larger were nine times greater on weekends and 10 times as numerous in May than other times.

The best improvement that could be made to the Caseville site would be the addition of at least one additional boat launching ramp. This is a very

busy site and complaints about having to wait an hour or more to launch or retrieve a boat were not uncommon. The parking problem is another condition that needs to be resolved. Better use could be made of the parking area near the current boat launch by paving and marking parking spaces on the new pavement. This would provide more efficient use of the area by preventing the random parking patterns of overflow parking conditions that waste potential parking area. A third need is the placement of permanent restroom facilities at both the base of the Caseville fishing pier and near the Caseville boat launch.

Fillion Road (Mud Creek)

Seventy-three percent of the 115 people interviewed at this state-owned site were shore anglers, 22% were boat fishermen, and 4% were recreational boaters (Table 3). The average person at this site had used it 3.4 times for shore fishing, 1.5 times for boat angling, 0.70 times for ice fishing, none for waterfowl hunting, and 0.43 times for recreational boating in the last year. Only 15% had launched a boat here three or more times and just 5% had done so 10 times or more. Thirty percent had used the site for shore fishing at least three times and 13% had a minimum of 10 times. Eight percent had been ice fishing at the site.

Ninety-eight percent of the boats had been trailered to the Fillion Road site and 2% were cartopped. Eighty-eight percent were powerboats, 9% were sailboats, and 3% were rowboats. The mean boat length was only 15.0 feet - the smallest for any Huron County site surveyed (Table 6). Eighty-one percent were 16' or less in length, only 3% were 18' or longer, and none were over 20 feet (Table 6). Ninety-three percent of the boats were powered by outboard motors, 3% by inboard/outboards, and 3% by inboards. The

average motor horsepower was only 32.2 with 34% under 20 horsepower (Table 7). Ninety-three percent were smaller than 70 hp and only 4% were 100 hp or more (Table 7).

Fifty-six percent of the people interviewed thought that the Fillion Road site needed improvements (84% of boat anglers). Thirty-nine percent of those that wanted improvements made said the channel needed dredging (75% of boat anglers). Another 15% wanted channel markers to delineate the edges of the channel. Fourteen percent would like some picnic tables placed at the site. Only 9% said the ramp or dock needed improving.

Potential improvements to the Fillion Road site include lengthening the present ramp, dredging the channel, and installing channel markers. This would vastly improve access from the site to Wildfowl Bay and offshore water, and allow larger boats to use the facility. The addition of a few picnic tables and shade trees for the benefit of picnickers and shore anglers would further enhance the site.

Fin and Feather

Only 42 people were interviewed at this state-owned site - the least of any Huron County site surveyed (Table 3). Seventy-nine percent of those interviewed were boat fishermen, 15% were shore anglers, and 3% were recreational boaters (Table 3). The average person at this site had used it 2.0 times for shore fishing, 6.1 times for boat angling, 1.4 times for ice fishing, 3.6 times for waterfowl hunting, and 1.5 times for recreational boating in the past 12 months. Fifty-nine percent had launched a boat at this site three times or more and 31% had launched one 10 or more times. Only 14% had been shore fishing here at least three times in the last year. Twenty-one percent had used the site for ice fishing and 9% had used it for

waterfowl hunting. In fact, this was the site where the most people interviewed had hunted waterfowl at the location than any of the other surveyed sites.

Ninety-seven percent of the boats had been trailered to the Fin and Feather site and 3% had been cartopped. Ninety-two percent were powerboats and 8% were rowboats. The 15.1 feet average boat length was almost as small as the 15.0 feet mean at Fillion Road (Table 6). Only 6% of the boats were larger than 16' and none were over 18 feet (Table 6). Ninety-seven percent were powered by outboard motors and 3% by inboards. The mean motor horsepower of 28.5 was the smallest of any Huron County site (Table 7). Thirty-nine percent were less than 20 hp, 92% were under 70 hp, and none were over 100 horsepower (Table 7).

Eighty-one percent of the people interviewed wanted improvements made to the site. Seventy percent of these said the channel needed to be dredged. Other comments included a desire for camping facilities (6%), channel markers (6%), and picnic tables (6%).

Again, as at Fillion Road, having the channel dredged would be the most significant improvement that could be made at this site. Channel markers would be useful if the channel were dredged. Improvements to the launching ramp, dock, and parking facilities would depend upon the depth the channel were dredged to and the resultant size of boat that could navigate it. A picnic table or two and some shade trees could be added to the site regardless of the undertaking of any other improvements.

Sumac Island

Sixty-two percent of the 110 people interviewed at this state-owned site were boat fishermen, 35% were shore anglers, and 1% were recreational boaters (Table 3). The average person at this site had used it 3.0 times

for shore fishing, 6.6 times for boat angling, 3.6 times for ice fishing, 1.0 times for waterfowl hunting, and 0.35 times for recreational boating in the previous 12 months. Fifty-five percent had launched a boat here three times or more and 25% had done so at least 10 times. Twenty-nine percent had been shore fishing here a minimum of three times and 12% had been 10 or more times. Thirty-two percent had been ice fishing here and 15% had used the site for hunting waterfowl. This site ranked second only to Filion Road among all sites surveyed in the number of people interviewed who said they had hunted waterfowl from the site.

Ninety-six percent of the boats had been trailered to the Sumac Island site and the remaining 4% had been cartopped. Ninety-two percent were powerboats, 6% were rowboats, and 2% were canoes or kayaks. The mean boat length was 15.6 feet (Table 6). Forty-nine percent were 16' or less, 88% were 18' or smaller, and only 5% were greater than or equal to 20 feet (Table 6). Ninety-four percent were powered by outboard motors, 3% by inboard/outboards, and 3% by inboards. The average motor horsepower was 33.6 with 22% less than 20 hp, 89% were smaller than 70 hp, and only 3% were 100 hp or larger (Table 7).

Fifty-four percent of the people interviewed thought the Sumac Island site needed improving. Thirty-seven percent of those wanted the channel dredged. Nineteen percent wanted the site enlarged in terms of more boat launching ramps (13%), more parking area (2%), or both (4%). Nine percent requested channel markers, 9% said the access road needed grading more often or paving, and 4% wanted the docking facilities improved.

Potential improvements for the Sumac Island site include widening and lengthening the boat launching ramp, adding a skid pier, dredging the

channel, installing channel markers and range poles, and constructing additional parking. These improvements will greatly increase the usefulness of the site as a boat launching facility. Additionally, arrangements should be made to grade the access road more often or to pave the road. A light in the vicinity of the ramp would enable a smoother launch flow during pre-dawn congestion during the duck hunting season.

Sebewaing

Eighty percent of the 199 site users interviewed at this city-owned site were boat fishermen, 16% were recreational boaters, and 3% were shore anglers (Table 3). The average person at this site had used it 1.0 times for shore fishing, 10.5 times for boat angling, 2.8 times for ice fishing, 0.18 times for waterfowl hunting, and 2.7 times for recreational boating in the prior year. Seventy-six percent had launched a boat here three times or more and 50% had launched one at least 10 times. Only 14% had been shore fishing at the site a minimum of three times and a mere 3% had done so 10 or more times. Twenty-one percent had been ice fishing at the site but only 2% had used it for hunting waterfowl.

All the boats were trailered to the Sebewaing site. Ninety-seven percent were powerboats, 2% were sailboats, and 1% were rowboats. The mean boat length here was 17.3 feet - comparable in size to those launched at Caseville (Table 6). Forty-four percent were 16' or smaller, 21% were over 18', and 17% were greater than or equal to 20 feet (Table 6). Seventy-two percent of the motors were outboards, 26% were inboard/outboards, and 2% were inboards. The average motor horsepower was 87.1 - again most closely comparable to Caseville's mean (Table 7). Nine percent were under 20 hp, 42% were less than 70 hp, 35% were 100 hp or larger, and 12% were equal to or greater than 150 horsepower (Table 7).

Fifty percent of the people interviewed at the Sebewaing ramp wanted improvements made at this site. Fifty percent of those wanted the site enlarged with more boat launching ramps (12%), more parking area (20%), or both (18%). Eighteen percent said the channel needed dredging, 8% wanted channel markers, and 8% wanted more or better docks.

The Sebewaing site needs to be enlarged with an additional boat launching ramp with a dock and more parking area. There were requests for dredging the channel but this site currently handles boats as large as those at Caseville and though dredging may be desirable, it is not the serious necessity it is at other sites.

Allen Drain

Sixty-nine percent of the 62 people interviewed at this state-owned site were shore fishermen, 23% were boat anglers, and 3% were recreational boaters (Table 3). The average person interviewed at this site had used it 5.3 times for shore fishing, 2.7 times for boat angling, 0.19 times for ice fishing, 0.08 times for waterfowl hunting, and 0.74 times for recreational boating in the last year. Thirty-two percent of those interviewed had launched a boat here three or more times and 17% had done so at least 10 times. Thirty-one percent had used the site for shore fishing at least three times and 18% had been shore fishing 10 times or more. Only 3% and 2% had gone ice fishing or waterfowl hunting respectively here in the past 12 months.

This site had more boats cartopped to it (16%) than any other site surveyed. The remaining 84% were trailered to the site. Seventy-nine percent were powerboats, 16% were rowboats, and 5% were canoes or kayaks. The mean boat length was 16.2 feet (Table 6). Fifty-nine percent were 16' or smaller, 88% were 18' or less, and 12% were 20' or more (Table 6). Most

of the boats were powered by outboard motors (88%), 6% by inboard/outboards, and 6% by inboards. The average size of the motors was 43.1 horsepower (Table 7). Eight percent were smaller than 20 hp, 77% were under 70 hp, 15% were 100 hp or more, and 8% were 150 hp or larger (Table 7).

Forty-six percent of the people interviewed felt the Allen Drain site needed improving. Despite the fact that many more shore anglers were interviewed than boat fishermen, 22% wanted the channel dredged. Another 22% said the boat launch should be improved. Fifteen percent requested better rest room facilities.

Potential site improvements include lengthening the ramp, dredging a channel, and installing channel markers. The ramp should also be widened at least six feet so the skid pier could be placed in the middle of the ramp instead of at one edge. This would allow two boats to be launched or retrieved at the same time instead of only one. A second toilet should also be placed at the site.

Tietz Drain

This state-owned site was used predominately for shore fishing as 74% of the 37 people interviewed here were shore anglers (Table 3). Twenty-three percent were boat fishermen and the final 3% were recreational boaters. The average person at this site had used it 9.1 times for shore fishing, 3.5 times for boat angling, 1.8 times for ice fishing, 0.30 times for waterfowl hunting, and 0.33 times for recreational boating in the previous year. Thirty-four percent had launched a boat at this site three or more times and 11% had launched one at least 10 times. Fifty-four percent had shorefished here a minimum of three times and 40% had done so 10 times or more. Eight percent had used the site for ice fishing and 5% had used it for hunting waterfowl.

All the boats had been trailered to the Tietz Drain site with 80% being powerboats, 10% canoes or kayaks, and 10% sailboats. The mean boat length was 15.0 feet - the smallest average length of the three Tuscola County sites (Table 6). Seventy-eight percent of the boats were 16' or less in length and all were 18' or smaller (Table 6). All the boats were powered by outboard motors with an average horsepower of 18.2 - the smallest mean horsepower of all the sites surveyed (Table 7). Seventy-five percent were under 20 hp and none were larger than 70 horsepower (Table 7).

Sixty percent of the site users surveyed mentioned specific improvements they would like made to the Tietz Drain site. Of those that wanted improvements made, the largest number (27%) requested that the channel be dredged. Thirteen percent said the road needed grading or paving and another 13% requested some picnic tables. Eight percent wanted improvements made to the launch itself.

If this site were to be improved, the channel should be dredged, channel markers installed, and a better boat launching ramp constructed.

Quanicassee

This state-owned site was the most heavily used of the three Tuscola County sites. Fifty-seven percent of the 195 people interviewed were boat fishermen, 30% were shore anglers, and 12% were recreational boaters (Table 3). The average person at the site had used it 3.2 times for shore fishing, 6.1 times for boat angling, 1.2 times for ice fishing, 0.28 times for waterfowl hunting, and 1.7 times for recreational boating in the last 12 months. Fifty-eight percent had launched a boat here three or more times and 34% had done so a minimum of 10 times. Twenty-four percent had been shorefishing at the site three times or more and 9% had shore fished there at least 10 times. Thirteen percent had gone ice fishing at the site and 5%

had used it for hunting waterfowl.

All the boats had been trailered to the Quanicassee launch site. Ninety-eight percent were powerboats, 1% were rowboats, and 1% were sailboats. The average boat measured 16.3 feet in length - the largest mean length for Tuscola County sites (Table 6). Sixty-two percent were 16' or smaller, 12% were over 18', and 6% were 20' or larger (Table 6). Eighty-one percent of the boats were powered by outboard motors, 13% by inboard/outboards, and 6% by inboards. The average motor size was 67.6 horsepower - also the largest in Tuscola County (Table 7). Eighteen percent were under 20 hp, 53% were smaller than 70 hp, 21% were at least 100 hp, and 7% were 150 hp or more (Table 7).

Only 41% of the people interviewed felt that the Quanicassee site needed any improvements. Of those that did want improvements made, 39% would like the site enlarged with more ramps (15%), more parking (12%), or both (12%). Twenty percent said the ramp dock needed to be improved.

The primary factor limiting public access at this location is the lack of parking space. This should be the first thing addressed as far as improvements to this site are concerned. Secondly, the ramp and the ramp dock should be improved if the parking area is expanded significantly.

Smith Park/Essexville

Interviews at this city-owned site in Bay County were gathered from two distinct locations about 200 yards apart on the Saginaw River in Essexville. Both locations had a boat launching ramp but road access between the two areas was rather indirect. Each location should technically be considered separately but due to the tendency of anglers to refer to either location as "Essexville" it was not possible to differentiate between the two during data analysis. Therefore, interviews from both sites were combined and a

single analysis conducted for the combined data.

These two sites received far greater use than any other site in Bay County or the southern portion of the Bay. The 552 site users interviewed here were fairly evenly divided into three groups with 42% using the location for boat fishing, 31% for shore angling, and 27% for recreational boating (Table 3). The average person at the site used it 3.8 times for shore fishing, 4.9 times for boat angling, 0.05 times for ice fishing, none for waterfowl hunting, and 9.7 times for recreational boating in the last year. In fact, this site was the most heavily used site by recreational boaters of all the sites surveyed. Fifty-two percent of the people interviewed had launched a boat here a minimum of three times and thirty-nine percent had launched one at least 10 times. Twenty-three percent had used the site for shore fishing three or more times and 11% had done so 10 times or more. Only 1% had gone ice fishing from this site and none had used it to hunt waterfowl.

All the boats had been trailered to the Essexville/Smith Park launching site. Fifty-seven percent were powerboats, 2% were rowboats, and 1% were sailboats. The average boat length of 17.2 feet was second in size in Bay County only to the Veteran's Park mean of 18.1 feet (Table 6). Forty-three percent were 16' or less, 78% were 18' or less, and 15% were 20' or more (Table 6). Sixty-three percent of the boats were powered by outboard motors, 21% by inboard/outboards, and 16% by inboards. The average motor horsepower at 102.3 was the third highest mean motor size of the sites surveyed behind those at Veterans Park and Port Austin (Table 7). Ten percent were smaller than 10 hp, 41% were under 70 hp, 40% were 100 hp or more, and 24% were at least 150 horsepower (Table 7).

Seventy percent of the people interviewed said the site needed to be improved. Twenty-six percent of those wanted the site enlarged with more launching ramps (11%), more parking (6%), or both (9%). Nineteen percent would like more or improved ramp docking facilities. Twenty-seven percent complained about the lack of restrooms.

The first improvement required here is the addition of some restroom facilities. Secondly, better docks should be provided as rather large boats are being launched at this site and good docks in sufficient number are needed as aids in launching and retrieving the bigger boats. Third, the parking area needs to be expanded. And fourth, another dual launching ramp should be installed.

Veterans Park

Only 16 people were interviewed at this city-owned site as it was learned that few boaters used this site as access to the bay itself due to the several mile run down the Saginaw River to reach the bay. This seems to be borne out by the fact that 62% of the people surveyed were recreational boaters versus only 13% that were boat anglers though this was from a very small sample size (Table 3). The average person at this site had used it 3.8 times for shore fishing, 1.2 times for boat angling, none for ice fishing or waterfowl hunting, and 9.7 times for recreational boating in the last year. Eighty-one percent had launched a boat three times or more and 43% had launched one a minimum of 10 times. Only 12% had been shore fishing at the site but each had been over 10 times.

All the boats had been trailered to the Veterans Park site and all were powerboats. The mean boat length was 18.1 feet which was the largest average length for boats at any site in Bay County and was second only to

Port Austin for the bay as a whole (Table 6). Twenty-three percent were 16' or smaller, 62% were 18' or less, and 31% were 20' or more (Table 6). Fifty-four percent of the boats were powered by inboard/outboard engines, 39% by outboards, and 7% by inboards. The average motor horsepower of 142.6 was the highest of any site surveyed with none less than 20 hp, only 31% smaller than 70 hp, 61% at 100 hp or more, and 54% equal to or greater than 150 hp (Table 7).

Sixty-seven percent of the Veterans Park site users surveyed wanted the site improved. Forty percent of those said to improve the access road by grading it more often or by paving it. Nineteen percent wanted more boat launching ramps and docks. Another 19% would like the area near the docks dredged.

At the present time, the site does not appear to receive enough use (based on visual observations when driving past the site at various times throughout the survey period) to warrant the addition of more launching ramps or docks. The docks appear to be adequate but could use some rubber bumpers to protect boats from rubbing against them. The access road definitely needs grading more often or paving as it was severely rutted during the entire summer.

Liaewood

Sixty-four percent of the 64 people interviewed at this site were boat anglers, 23% were recreational boaters, and 13% were shore fishermen (Table 3). The average person at this site had used it 1.2 times for shore fishing, 8.1 times for boat angling, 4.6 times for ice fishing, 0.43 times for waterfowl hunting, and 2.0 times for recreational boating in the past 12 months. Eighty-five percent had launched a boat at this site three times or

more and 33% had done so 10 or more times. Nineteen percent had used the site for shore fishing, 36% for ice fishing, and 6% for waterfowl hunting.

All the boats were trailered to the site. Seventy percent were powerboats, 23% were sailboats, and 7% were rowboats. The average boat length was 15.2 with 80% being 16' or less in length, 98% at 18' or under, and only 2% being 20' or over (Table 6). Ninety-eight percent of those with motors were powered by outboard engines and 2% by inboards. The mean size of the motors was 26.5 horsepower (Table 7). Forty-five percent were less than 20 hp, 90% were smaller than 70 hp, and just 2% were 100 hp or more (Table 7).

Eighty-six percent of the people interviewed thought the site needed improvements. Twenty-nine percent wanted the channel dredged, 24% wanted a boat launching ramp put in, and 9% said the road needed improving.

This site needs to have the channel dredged first. Then a boat launching ramp could be installed as this site currently has only a graded gravel area serving as the launch. If these two improvements were made, the parking area would probably need enlarging to handle the additional use the site would get.

Coggins Drain

Seventy-four percent of the 103 site users interviewed at this state-owned location were boat fishermen, 24% were shore anglers, and 1% were recreational boaters (Table 3). The average person at this site had used it 1.5 times for shore fishing, 6.9 times for boat angling, 5.5 times for ice fishing, 0.67 times for waterfowl hunting, and 0.56 times for recreational boating in the previous year. Fifty-one percent of those interviewed had launched a boat three times or more and 26% had launched one

over 10 times. Twenty-seven percent had been shore fishing at the site, 42% had used it for ice fishing, and 6% had used it for hunting waterfowl.

Ninety-eight percent of the boats had been trailered to the Coggins Drain site and rest had been cartopped. Ninety-eight percent were powerboats, 1% were rowboats, and 1% were canoes or kayaks. The average boat length of 14.9 feet was the second smallest mean boat size of all the sites surveyed (Table 6). Ninety percent were 16' or smaller, 98% were 18' or less, and only 1% were 20' or larger (Table 6). Ninety-five percent were powered by outboard engines, 4% by inboard/outboards, and 1% by inboards. The 25.2 mean horsepower of the motors was the smallest average motor horsepower of any site surveyed (Table 7). Forty-nine percent were under 20 hp, 96% were less than 70 hp, and only 3% were 100 hp or more.

Eighty-one percent of the people interviewed wanted the Coggins Drain site improved. Sixty-four percent of those said the channel needed dredging. Seventeen percent wanted the boat launching ramp improved. Six percent would like a dock installed, and 5% requested more parking area.

Potential improvements to this site include the construction of a dual launching ramp with a skid pier, increasing the parking area, dredging the channel, and putting in channel markers. These improvements would enhance the site considerably in terms of providing boaters access to Saginaw Bay. No other improvements to this site seem necessary at this time. Snow should be cleared from the parking lot to provide parking for ice fishermen.

Pinconning

Sixty-three percent of the 46 people interviewed at this state-owned site were boat anglers, 28% were recreational boaters, and 9% were shore fishermen (Table 3). The average person at this site had used it 1.5 times

for shore fishing, 5.8 times for boat angling, 2.1 times for ice fishing, 0.07 times for waterfowl hunting, and 1.2 times for recreational boating in the last 12 months. Sixty-nine percent had launched a boat three or more times at this site and 35% had launched one at least 10 times. Seventeen percent of those interviewed had used the site for shore fishing, 26% for ice fishing, and 4% for hunting waterfowl.

Ninety-eight percent of the boats had been trailered to the Pinconning site and 2% had been cartopped. Sixty-two percent were powerboats, 21% were sailboats, 14% were rowboats, and 3% were canoes or kayaks. The average length of boats launched at this site of 14.8 feet was the smallest mean boat length for any site surveyed (Table 6). Eighty-eight percent of the boats were 16' or less in length, 98% were 18' or smaller, and only 2% were 20' or more (Table 6). All the boats were powered by outboard engines, the average size of which was 28.1 horsepower (Table 7). Fifty-three percent were under 20 hp, 93% were less than 70 hp, and 3% were at least 150 horsepower (Table 7).

Seventy-four percent of the people interviewed at the Pinconning site wanted improvements made. Fifty-five percent of those that would like the site improved requested that the channel be dredged. Twenty-three percent said the access road needed improving and 7% would like more parking area.

Potential improvements to this site include reconstructing a ramp with a skid pier to replace the existing cement ramp, increasing the parking capacity, paving the parking and maneuver areas, dredging the channel, and installing channel markers. The ramp should be widened so that the skid pier could be placed in the center of the ramp to allow two boats to be launched at the same time. These improvements would make this

site adequate for boating access to Saginaw Bay and no other improvements are currently deemed necessary.

Pine River

Fifty percent of the 25 people interviewed at this state-owned site were boat fishermen, 42% were shore anglers, and 8% were recreational boaters. In the last year, the average person had used the site 1.8 times to shore fish, 8.5 times for boat angling, 0.28 times for ice fishing, 0.28 times to hunt waterfowl, and 0.96 times for recreational boating. Sixty percent had used the site for boat fishing, 52% for shore fishing, 12% for ice fishing, 12% for waterfowl hunting, and 20% for recreational boating.

Ninety-three percent of the boats had been trailered to the Pine River site and the remaining 7% had been cartopped. Eighty-six percent were powerboats, 7% were rowboats, and 7% were canoes or kayaks. The average boat length was 15.5 feet with 85% being 16' or less and the other 15% more than 18' but less than 20 feet (Table 6). Ninety-two percent of the boats were powered by outboard engines and 8% by inboards. The mean horsepower of the motors was 62.3 horsepower (Table 7). Thirty-one percent were less than 20 hp, 85% were under 70 hp, and 8% were at least 150 horsepower (Table 7).

Sixty-four percent of the people interviewed said the Pine River site needed improvements. Nineteen percent of these wanted the channel dredged and another 19% requested channel markers. Six percent wanted the boat launching ramp improved.

Improvements this site needs are channel dredging and installation of channel markers. The launching ramp and dock may need improving if the channel is dredged to a depth such that it could accommodate larger boats.

Au Gres

Seventy-one percent of the 286 people interviewed at this state-owned site were boat fishermen, 19% were shore anglers, and 9% were recreational boaters (Table 3). The average person interviewed at this site had used it 1.5 times to shore fish, 5.5 times for boat angling, 0.93 times for ice fishing, none to hunt waterfowl, and 1.1 times for recreational boating in the last 12 months. Fifty-eight percent had launched a boat three times or more and 27% had done so at least 10 times. Thirty percent had used the site for shore fishing but only 9% had over three times. Eleven percent had gone ice fishing here but none had used this location for hunting waterfowl.

All the boats had been trailered to the Au Gres site. Ninety-six percent were powerboats, 3% were sailboats, and 1% were canoes or kayaks. The mean boat length was 16.9 feet (Table 6). Fifty-three percent were 16' long or less, 81% were 18' or smaller, and 10% were equal to or greater than 20 feet (Table 6). Seventy-two percent were powered by outboard engines, 18% by inboard/outboards, and 10% by inboards. The average size of the motors was 87.8 horsepower (Table 7). Fourteen percent were smaller than 20 hp, 49% were under 70 hp, 34% were 100 hp or more, and 16% were at least 150 horsepower (Table 7).

Forty-nine percent of the people interviewed mentioned specific improvements they felt should be made to the Au Gres site. The most numerous request (22% of those that answered the question) was for more boat launching ramps. Sixteen percent wanted the access road improved. Ten percent would like a water faucet or pump installed for both drinking water and for washdown at a fish cleaning station. Eight percent said the site needed to be enlarged with more parking area. There were three times as

many complaints about there not being enough boat launching ramps received on weekends than during the week. Also, many people (21%) complained about having to pay a \$3.00 daily fee in order to use the Au Gres site.

The most pressing improvement needed at the Au Gres site is the addition of a third dual boat launching ramp to alleviate the congested conditions that exist early in the morning and on weekends. The construction of more temporary docking facilities would also be useful during times of intense launching or retrieval activity such as when a squall comes up and blows many boaters off the bay at the same time. Something should be done about either paving the access road or grading it more often as this site is heavily used and the road is badly rutted. The installation of a pump or faucet for drinking water would also be a worthwhile addition.

Additional specific information for each site was gathered and processed but due to budget and time constraints was not interpreted in this report. This site-specific information includes the following: county of residence of the people interviewed, where they would prefer an additional site and why, the number that stayed overnight and the percent that used various types of accommodations, the times people arrived and departed as well as the total time at the site, how long it took them to get to the site, and how many miles they traveled to reach the site.

CONCLUSION

The Saginaw Bay waters of Lake Huron were found to provide recreational activities not only for local residents, but for people from 45 Michigan counties and several other states. These waters, rather than being simply a regional asset, constitute a state resource and should be treated as such. Public access sites on Saginaw Bay are the means by which most people gain access to the bay and should be representative of the quality of access facilities provided in the State of Michigan to Great Lakes waters. In general, Saginaw Bay public access sites do not currently provide the access quality that should exist in an area of such recreational importance.

Most public access sites on Saginaw Bay have a clientele of repeat users as well as a continual influx of people who have never used that particular site before but are looking for new recreational areas to use. The significant number of new users at each site could indicate one or more of the following: first, that there are a large number of people seeking access to the bay for the first time and the quality of the access available at the site determines whether these people return again or not; second, that the more popular or favored sites are overcrowded and the new users are trying to access the bay in a less congested area; or third, that these people have become dissatisfied with another site and are seeking one more suited to their desires or needs.

The importance of providing good boat launching facilities can be seen in the fact that 99% of all boats had been trailered to the sites versus only 1% that were cartopped and which are able to use sites with poorer launching conditions. This is because the open waters of the Great Lakes require larger boats and more powerful motors than do inland lakes. The

bigger the boat the heavier and more unwieldy it becomes and the necessity of having good launching ramps and facilities increases.

Four sites presently support the bulk of the demand for boat launching facilities on Saginaw Bay - Port Austin and Caseville in Huron County, the Smith Park/Essexville site in Bay County, and the Au Gres site in Arenac County (Figure 1). This is because they are among the few public access sites on Saginaw Bay with channels deep enough for large trailerable boats to navigate safely under a variety of lake levels and weather conditions. The single greatest obstacle to providing adequate access to bay waters is the wide shallow littoral zone with long distances between natural channels. All of the major access facilities are placed where natural channels occurred.

The few sites that currently have channels of adequate depth are overcrowded, as larger boats are restricted to using these sites because of the amount of water they draw, and need to be enlarged. The capacity of these sites should be increased by concurrently increasing the number of boat launching ramps and the area available for parking. Additional docking facilities to provide temporary mooring sites for boaters while waiting in line are also needed at these sites to handle the overflow boat volume during peak boat launching and retrieving periods. Temporary mooring sites might enable launched boats to clear the ramp more quickly, thus providing for more efficient use of existing ramps. Launch ramp attendants trained to facilitate launching and retrieval and to control traffic might increase efficiency of ramp use during peak volume periods at the larger sites.

Because Saginaw Bay users seek access to portions of the Bay which lie beyond prudent small boat cruising distance from these major access sites, additional adequate facilities should be provided. Several public access

sites lie between the major sites and at selected sites, artificial channels should be dredged. Wave action and alongshore currents will result in sediment deposition in the channels and declining lake levels may require more extensive or more frequent dredging. At some locations berms or jetties may be necessary to protect channels from filling in. Some sites might have to be abandoned as the consequence of rapid channel siltation or declining lake levels. Supplemental dredging may be required to maintain selected channels during periods of low water. Dredging of channels at sites not recommended in this report or abandonment of channels at recommended sites are alternatives which can be considered only after a subsequent survey shows that more access is required or that there is insufficient use to justify dredging costs.

There are many miscellaneous improvements that could be made to enhance the sites but these are not crucial to their suitability for launching boats. Many of the dirt access roads need to either be surfaced or graded on a more regular basis as they were severely rutted. The addition of edge channel markers and a lighted marker at the lakeward end of the channel would be appreciated by many users, as would the installation of a pump or faucet for drinking water. Many people would like lighted parking areas. Shore anglers in particular mentioned a desire for picnic tables, shade trees, and adequate toilet facilities at some of the sites.

Scheduled Improvements

Currently funds have been obtained by the MDNR Waterways Division to improve two Saginaw Bay public access sites and for creation of a third. The Port Austin site in Huron County is to be improved by the addition of a public boat launching ramp and increased parking area. Vehicular traffic congestion at Au Gres in Arenac County will be reduced by the construction

of an access road to the shore fishing parking lot next to the north pier which bypasses the boat launch access road and parking area. A double ramp and parking lot will be constructed near the commercial fishing dock in Bayport, Huron County. The MDNR Waterways Division has also recently acquired property adjacent to the Caseville pier.

Recommendations:

The MDNR Waterways Division does not have sufficient funds to implement improvements at all Saginaw Bay sites which have impaired access. Local units of government could enhance chances for specific site improvements by providing funds to match MDNR Waterway Division resources. The following recommendations for site improvement are made in an attempt to reconcile the need for improvements with the present economic realities.

Priority should be given to improving the following existing access sites: Sumac Island, Allen Drain, Smith Park/Essexville, and Coggins Road. These sites are located near popular or traditional fishing areas. Use of the Smith Park/Essexville site is impaired by inadequate parking and too few ramps of poor condition. Expanded parking and at least two additional launching ramps are needed at this location. The Sumac Island site should have the channel dredged and an additional ramp installed. A concrete ramp should be installed at the Coggins Road site, the channel dredged, and a snow removal program implemented to provide parking for ice fishermen. At both Sumac Island and Coggins Road, range markers with lights should be installed at the onshore end of the dredged channels. The Allen Drain channel needs to be dredged and the mouth of the channel should be marked with buoys. In the event that all of these priority improvements cannot be funded in the near future, we recommend that further prioritization be

established on the basis of the absolute number of site users which will be identified in MDNR creel census information.* This more detailed prioritization should provide a high ranking for channel improvements at one of the three sites where dredging was recommended.

Access sites at Caseville, Sebawaing, Quanicassee, Pinconning, and Au Gres also require improvements, but of lower priority. The Pinconning site needs channel dredging. At Caseville adequate toilet facilities and parking are required adjacent to the fishing pier. Parking at the public ramp needs to be better organized. This could be accomplished by gravel surfacing and delineation of drives and parking places with concrete bumpers. If overflow from the public site is to be directed to nearby private launching ramps, then a legible sign bearing a map showing the routes to the private sites should be placed in a prominent location at the public site entrance. Expanded parking areas and one additional ramp each should be added to both the Sebawaing and Quanicassee sites. An additional double ramp needs to be added to the Au Gres site at the upriver end of the trailer parking area. If the user fee for Au Gres cannot be eliminated, then a prominent sign justifying the fee should be placed at the entrance. Additionally, shade trees should be planted at the Fillion Road site and picnic tables placed at Fillion Road, Allen Drain, and Sebawaing on a trial basis.

Strong interest has been expressed for new access sites at Bay City State Park and between Caseville and Port Austin at the mouth of the Pinnebog River. The exposed shoreline and gently sloping bottom at these

*A MDNR creel census was conducted concurrently with this study and information on the total number of people using each site (instead of only the number interviewed) will be available from the Institute for Fisheries Research in Ann Arbor, Michigan by the spring of 1983.

sites present significant construction and maintenance problems. Channels must be dredged from shore to deep water and extend lakeward to a sufficient depth to provide access during periods of low lake level. These channels must be protected by breakwalls in order to prevent filling by sediments transported by wave action and alongshore currents. Launching ramps need to be protected from wave action as well, in order to enable safe retrieval of boats during storms.

The Bay City State Park site would require approximately 400 feet of breakwater and 1,100 feet of dredged channel. Since there would be no natural river current to flush the channel, frequent dredging is anticipated with an anticipated cost (MDNR estimate) of about \$125,000 per year.

A longer channel would be required at the Pinnebog site because of offshore sand bars. Ephemeral bars found at the river mouth would be displaced by breakwater construction, but might recur at the end of the breakwall. This possible bar formation could be disrupted during periods of high flow during spring runoff, but re-establishment from alongshore current deposition during summer may necessitate frequent dredging to maintain safe access to the channel. Breakwater construction could result in significant beach erosion along adjacent beaches to the west of the river mouth, particularly during periods of high lake level.

Both sites would provide significant increases in public access to Saginaw Bay in areas where demand is high. These sites lie within state park boundaries with ample room for development of access roads and parking. The Bay City State Park site contains existing parking areas near potential ramp sites and includes approximately 250 campsites with toilets and showers. The proximity of this park to urban areas and to the I-75 freeway enables ready access for large metropolitan populations in the

southeastern part of Michigan. Strong local support exists for the addition of boat launching facilities to Bay City State Park.

The potentially high dredging costs for maintaining these sites requires that feasibility studies to compare benefits with costs be conducted before further development can be justified. Coastal engineering studies are recommended to determine the rate at which channel sedimentation would occur, frequency and scheduling of dredging, and appropriate dredging methods to minimize cost and environmental impact. Dredging frequencies and costs for blind channels of similar configuration in Saginaw Bay should be reviewed. Alternative funding mechanisms for initial construction and annual maintenance should be identified.

Initial feasibility work including review of existing Saginaw Bay dredging activity, methods, and costs, literature review, and preliminary engineering calculations using existing data should be funded. Preliminary projections of economic benefits should be made using output from an economic survey of anglers presently being conducted by Michigan State University. If the outcome of this preliminary work suggests that further effort is justified, then more comprehensive studies should be conducted to provide an accurate assessment of sedimentation rates and related dredging costs. Sediment transport models incorporating alongshore transport, wave action resuspension, and shoreline structure impact functions should be used to predict dredging frequency. These predictions should include an assessment of the need for unscheduled dredging resulting from storms occurring at unusual frequencies and intensities. Appropriate field surveys should be conducted to support the modeling effort.

This study has shown that Saginaw Bay is a popular state resource and

that there currently exists a large demand for access to this resource. It has also documented the public's perception of the inadequacies of the individual access sites which turned out to be rather extensive. Suggestions have been made to improve public access to Saginaw Bay by assigning priorities to which sites should be improved first and what improvements need to be made at these sites. The demand for public access to Saginaw Bay is expected to increase substantially in the near future and improvements in site facilities must be made to accommodate this demand.

Public Participation

Preliminary findings were presented and public input was received at meetings with elected public officials, representatives of local government, county planning officials, businessmen, individual citizens, and sportsmens organizations. The following list summarizes public participation meetings and locations:

Bay City

- Saginaw Bay Advisory Committee
- Michigan United Conservation Clubs
- individual citizens
- Michigan DNR

Bay City

- Bay County Natural Resources Committee
- MDNR
- City of Bay city
- Bay County
- representatives of state legislators
- representatives of U. S. congressmen
- MUCC
- East Michigan Tourist Association
- Bay County Chamber of Commerce
- individual citizens
- charter boat operators
- news media
- Greater Saginaw Bay Fishing Consortium
- Michigan Steelheaders

Bad Axe

- Huron County Commissioners
- news media
- Huron Intermediate School District

Bayport

- Village officials
- Huron County Commissioners
- local businessmen

Caro

- Tuscola County Commissioners
- Tuscola County Planning Commission

Saginaw

- East Central Michigan Planning Commission
- ECMPDR Environmental Advisory Committee

Sebewaing
Village of Sebewaing
Huron County Commissioners
MDNR
news media
local businessmen

Public input was obtained through site surveys and through numerous informal discussions with business people located near the access sites.

Preliminary Engineering

Sites with impaired access were identified early in the survey process by ECOMPDR staff. Selected sites were chosen with assistance from the MDNR Waterways Division for preliminary engineering studies to define potential improvements and provide preliminary cost estimates. These studies were conducted by the MDNR Waterways Division Lansing staff. Waterways Division field staff and ECOMPDR staff assisted in field surveys.

The preliminary engineering report for the following sites constitutes Appendix A: Placconing State Park, Coggins Road, Allen Cut, Sumac Island, and Filion Road. For each site information is presented on amount of dredging required, recommended dredging methods, and potential site improvements. Cost for improvements at each site are estimated.

LITERATURE CITED

Michigan Department of Natural Resources - Natural Resources Register. 1982.

Vol. 2, No. 5. 24 p.

Ryckman, James R. Michigan Department of Natural Resources; Institute for Fisheries Research; Ann Arbor, Michigan. Personal Communication.

Schneider J. C., and J. H. Leach. 1979. Walleye stocks in the Great Lakes 1800-1975: fluctuations and possible causes. Tech. Rep. No. 31. Great Lakes Fish Comm. Ann Arbor, Michigan.

Sport Fishing Institute Bulletin. 1982. No. 335. 8 p.

Stoermer, E. F. Great Lakes Research Division, University of Michigan. Personal Communication.

APPENDIX A
SAGINAW RAY PUBLIC ACCESS
PRELIMINARY ENGINEERING STUDY

SAGINAW BAY PUBLIC ACCESS

PRELIMINARY ENGINEERING STUDY

PREPARED BY: DNR - WATERWAYS DIVISION

THIS STUDY FUNDED BY: The Coastal Zone Management Act, Administered by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration. The Michigan Coastal Management Program, Administered by the DNR - Land Resource Programs Division. And, in Cooperation with the East Central Michigan Planning and Development Region.

SUMMARY

The sites studied included . . .

- Bay County - Pinconning State Park (existing and alternate)
- Coggins Road P.A.S.
- Tuscola County - Allen Cut P.A.S.
- Huron County - Sumac Island P.A.S.
- Filion Road P.A.S.

with individual determinations made for the following aspects at each site:

Amount of Dredging Required

Each site's access channel was checked for existing water depths and bottom conditions with the use of range poles, peat rods and a hydraulic wash boring rig. A design channel depth of three feet below the International Great Lakes Datum and 40' wide at the base was chosen to provide safe access for most trailerable boats in low water times.

The length of the dredged channel required was found by measuring out to 4 1/2 to 5 feet of water, which at the time of soundings reflected the bottom contour of 3' below water datum. For each channel, sections are shown that reflect the water depth and type of material to be dredged, with a separate listing of earthwork quantities.

Method of Dredging Recommended

Four thumb area dredging contractors were contacted concerning dredging methods used in Saginaw Bay. Also, three Department of Natural Resources personnel who worked closely with Saginaw Bay dredging projects were contacted for input.

The method most recommended was the berm method utilizing either a dragline or backhoe. The machine dredges material from half of the channel width and deposits it on a spoils bank. The machine works off the spoils bank out to the desired water depth, then the spoils bank and the other half of the channel width is dredged and brought back to shore by truck. Another method that can sometimes be used is to operate a backhoe off the ice and load the dredged materials into dump trucks. This method can be used when the ice is solid to the lake bottom only. The draw backs to this method are the winter weather conditions and the problems with getting insurance when working off the ice. This method was judged to be more expensive than the spoils bank method. The hydraulic dredge method was investigated and was not deemed feasible since the smaller hydraulic dredges only dredge silts and sands and will not cut the clay materials which were found at each site. Also, the cost estimate for hydraulic dredging is twice as much as that for the backhoe-dragline spoils-bank method.

All dredged spoils will be completely removed from the lake and deposited onto uplands, not in a wetland, in a manner to prevent return/siltation into the lake or wetland.

Site Improvements

The individual site improvement recommendations were arrived at by reviewing present site facilities and determining if these would be adequate for anticipated increases in site use due to the expanding walleye and perch fishery in Saginaw Bay. All existing concrete plank ramps need to be increased in length to provide adequate water depth at lower water levels. The Coggins Road site needs a new concrete plank ramp.

Skid piers will be used at all sites to assist the boater in launching and retrieving and to provide temporary docking.

Most existing parking areas should be expanded and designated by the use of concrete parking bumpers. Concrete parking bumpers will be used whenever possible to control parking since they can be readily removed for winter snow removal operations. Vault-type toilet facilities will be maintained throughout the winter on sites which are used by persons who gain access to the lake to fish through the ice.

Channel marker buoys recommended are Rolyan model numbers 1148-R (red) and 1148-B (black). These buoys are 9 inches in diameter and 61 inches high and float with 36 inches of exposure. The red and black buoys would be placed opposite each other at the edges of the channel and the spacing between the sets would be 400 feet.

It is recommended that range poles with targets be installed on sites which have straight channels and are clear of trees. The height of the poles, size of the targets, and distance between the poles will have to be determined on an individual site basis.

Costs

The cost estimates for individual sites are listed below. These cost estimates were derived using recent dredging costs from local dredging contractors and by using recent force account costs from projects constructed by Waterways Division construction crews.

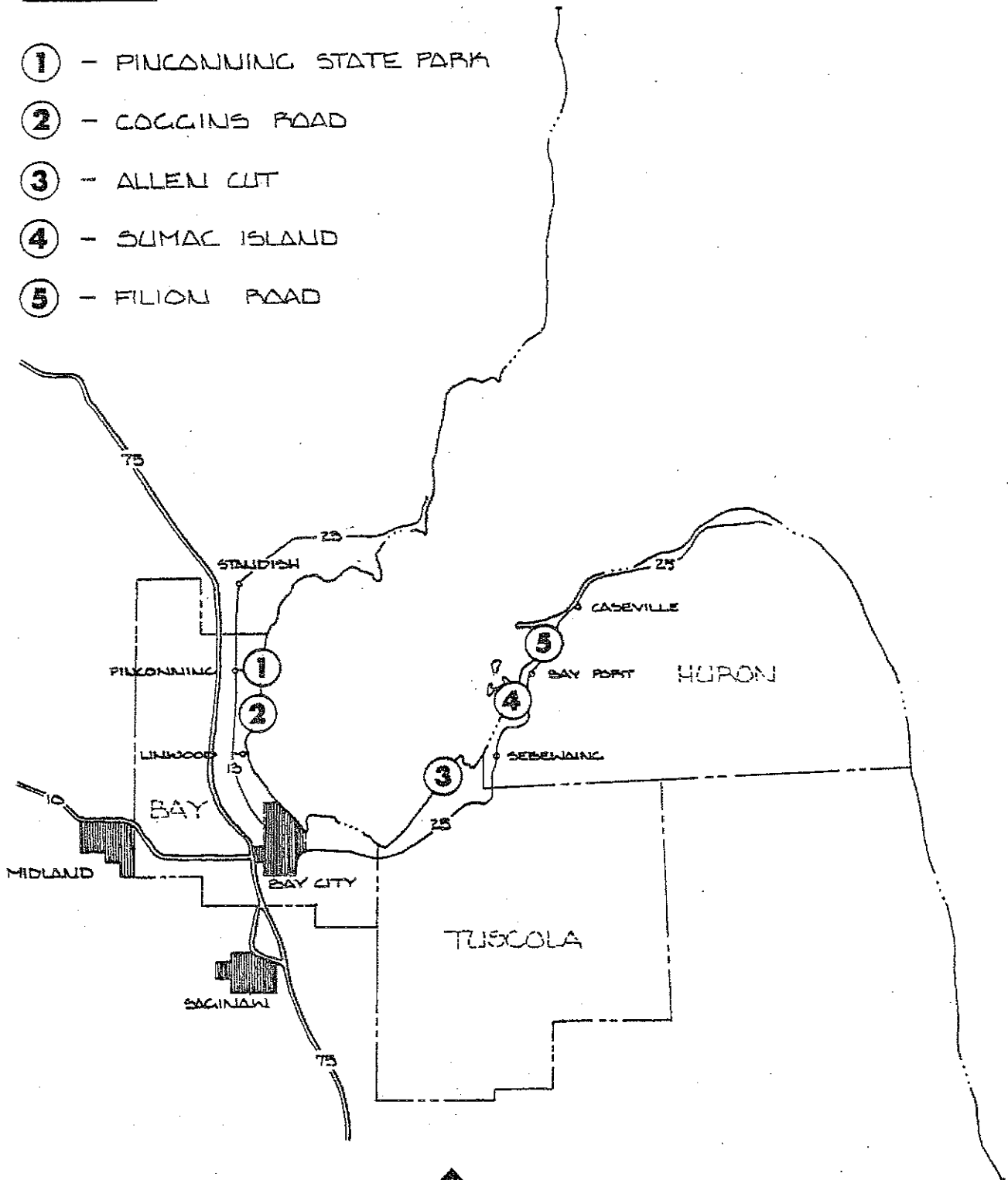
Site	Dredging Cost	Site Improve- ment Cost	Total
Pinconning S.P. (existing)	\$ 64,295	\$ 23,560	\$ 87,855
Pinconning S.P. (alternate)	116,710	35,180	151,890
Coggins Road	106,645	29,290	135,935
Allen Cut	39,050	9,075	48,125
Sumac Island	16,775	24,255	41,030
Filion Road	63,910	5,610	69,520

A complete breakdown of costs is included with each site description.

LOCATION MAP

LEGEND :

- ① - PINCONNING STATE PARK
- ② - COGGINS ROAD
- ③ - ALLEN CUT
- ④ - SUMAC ISLAND
- ⑤ - FILION ROAD



BAR SCALE

0 5 10 25 (MILES)



This site is located in Bay County, five miles east of I-75 and two miles east of Pinconning off M-13.

The existing site consists of gravel parking for six cars and six car and trailer units, two vault type toilets and a twenty-four foot by sixty foot concrete plank ramp. Neither the slope nor the depth of the ramp meet Waterways' standards. There are submerged pilings just south of the ramp which extend lakeward 500 to 600 feet. The distance from the ramp to two feet below datum is nine hundred feet. At this point, it is necessary to head southeast 2,716 feet to the Pinconning River channel then go east to deep water. As shown on the sketch of this area, the total length of dredging will involve 900 feet out from the ramp, then 336 feet southeast to an area which is presently at 3.0 feet below datum for approximately 1,780 feet, then 600 feet to the channel of the Pinconning River, then 2,600 feet lakeward. This results in a total of 4,436 feet of dredging to obtain a minimum depth of three feet below datum.

Proposed improvements include reconstructing the ramp to a 13% slope with a toe elevation three feet below datum, increasing the parking capacity to ten cars and twenty-five car and trailer units and paving the parking and maneuver areas. In addition, a channel with a 40 foot bottom width would be dredged to three feet below datum. Marker buoys would be placed on the channel, the submerged pilings marked for safety and a sign placed in the 900 foot area which would direct boaters to the Pinconning River Channel.

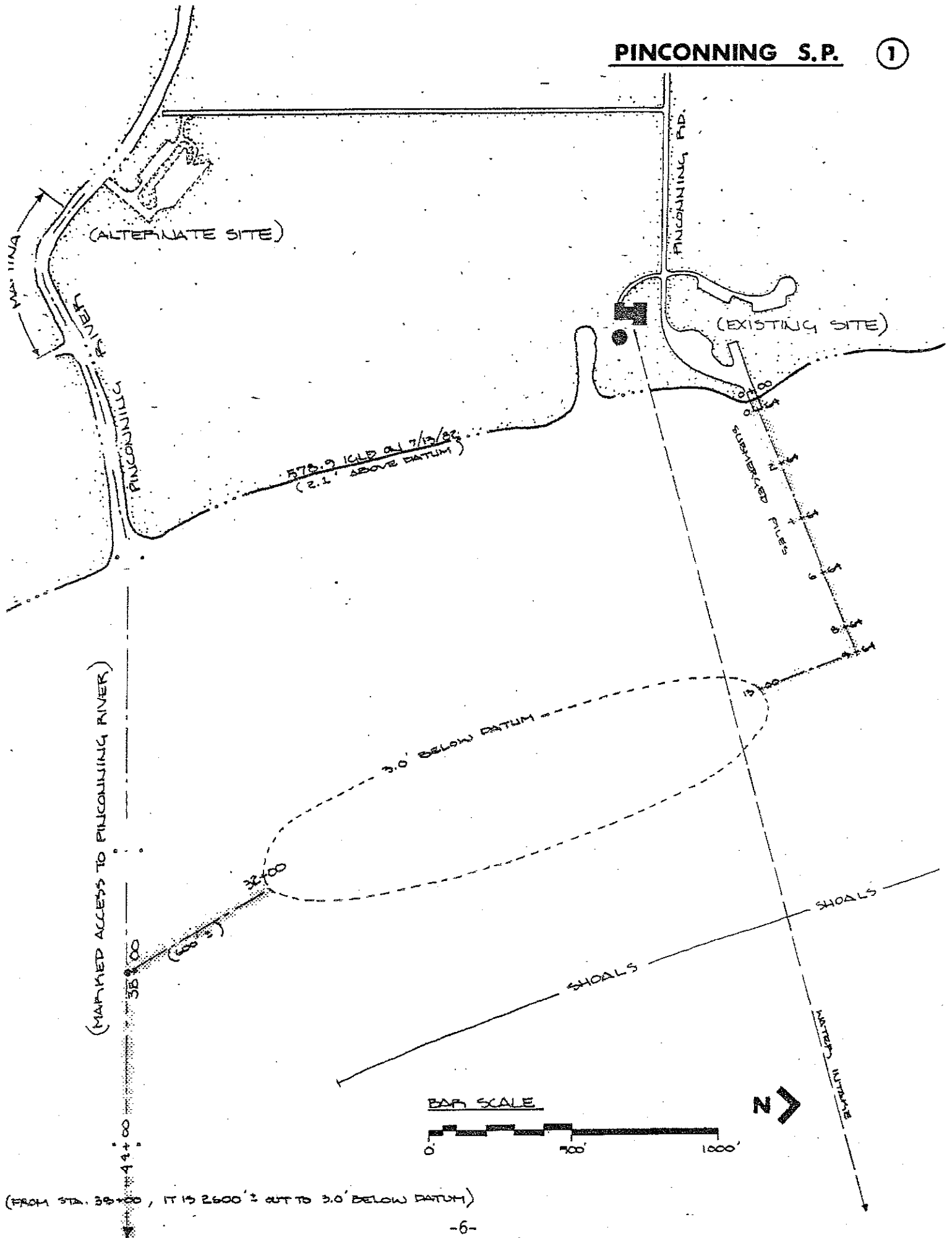
Both State and Federal permits must be obtained before proceeding with the dredging and reconstruction of the launch ramp.

The channel dredging would be done on a contract basis. The Waterways Division construction crew would reconstruct the ramp, construct the parking improvements and install the necessary markers and signs. The project could be completed in the one construction season.

No major problems are expected in the construction of this project.

PINCONNING S.P.

①



SOUNDINGS - ANCONNING

WATER SURFACE EL. 578.9 IGLD ON 7/13/82

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
<u>0 + 00</u>	<u>-</u>	<u>-</u>	<u>¢ TOP OF RAMP</u>
<u>+ 40</u>	<u>-</u>	<u>-</u>	<u>WATER SURFACE AT ¢ RAMP</u>
<u>+ 60</u>	<u>2.2'</u>	<u>-</u>	<u>END ¢ RAMP</u>
<u>+ 64</u>	<u>-</u>	<u>-</u>	<u>" SKID-PIER</u>
<u>2 + 64</u>	<u>2.7'</u>	<u>FIRM SAND/GRAVEL</u>	<u>OPEN WATER</u>
<u>4 + 64</u>	<u>3.2'</u>	<u>" "</u>	<u>" "</u>
<u>6 + 64</u>	<u>3.5'</u>	<u>" "</u>	<u>" "</u>
<u>8 + 64</u>	<u>3.7'</u>	<u>" "</u>	<u>" "</u>
<u>9 + 64</u>	<u>4.0'</u>	<u>" "</u>	<u>" " - TURN SOUTH TO</u>
<u>+ -</u>	<u>-</u>	<u>-</u>	<u>SKIRT SANDBAR</u>
<u>13 + 00</u>	<u>5.0'</u>	<u>" "</u>	<u>" "</u>
<u>32 + 00</u>	<u>5.0'</u>	<u>" "</u>	<u>" "</u>
<u>38 + 00</u>	<u>3.2'</u>	<u>" "</u>	<u>" "</u>
<u>44 + 00</u>	<u>2.8'</u>	<u>" "</u>	<u>" "</u>
<u>54 + 00</u>	<u>3.5'</u>	<u>" "</u>	<u>" "</u>
<u>64 + 00</u>	<u>4.5'</u>	<u>" "</u>	<u>" "</u>
<u>+ -</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>+ -</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>+ -</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>+ -</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>+ -</u>	<u>-</u>	<u>-</u>	<u>-</u>

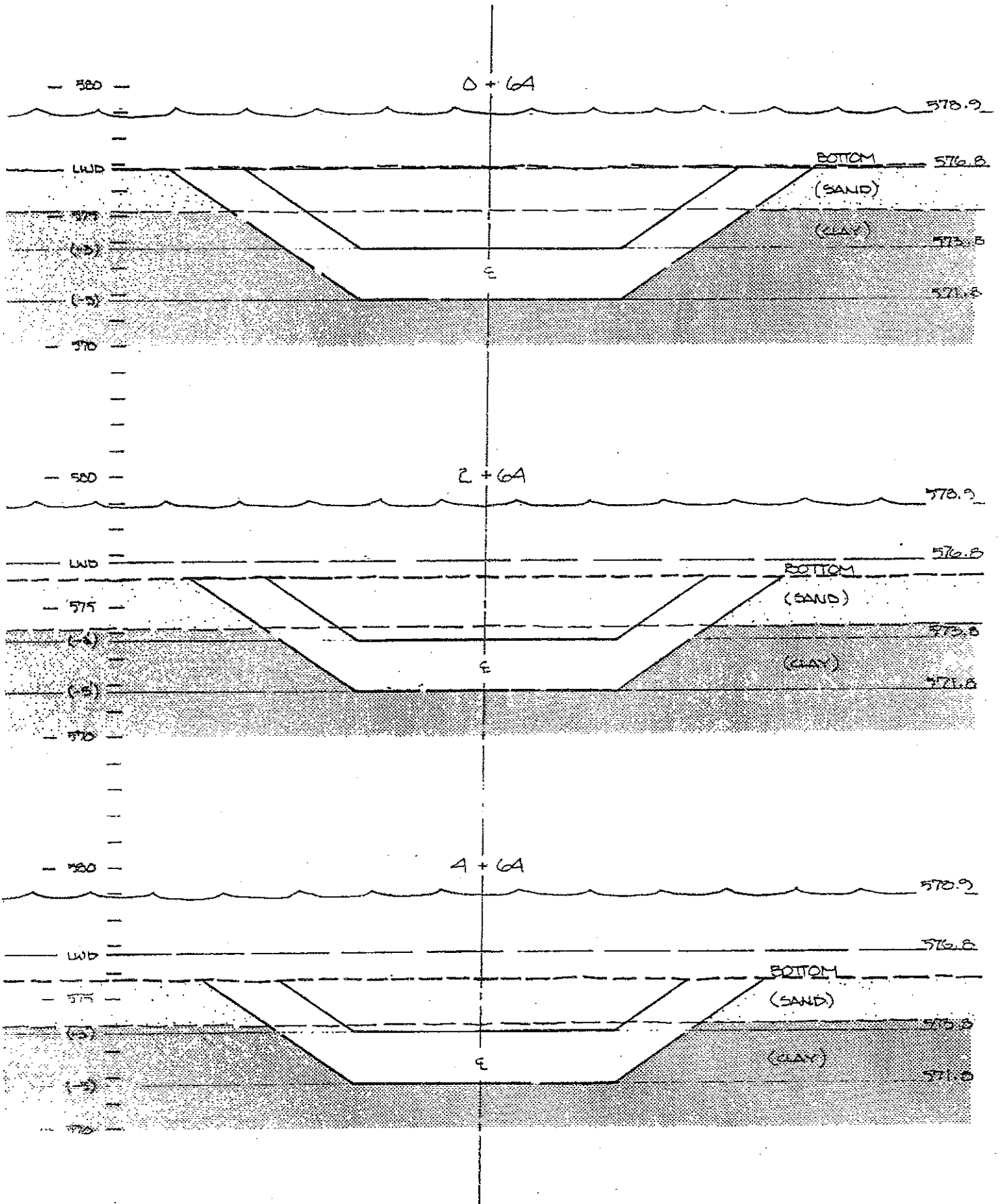
PROBINGS - PINKONING

WATER SURFACE EL. 579.1 ICILD CN 8/10/82

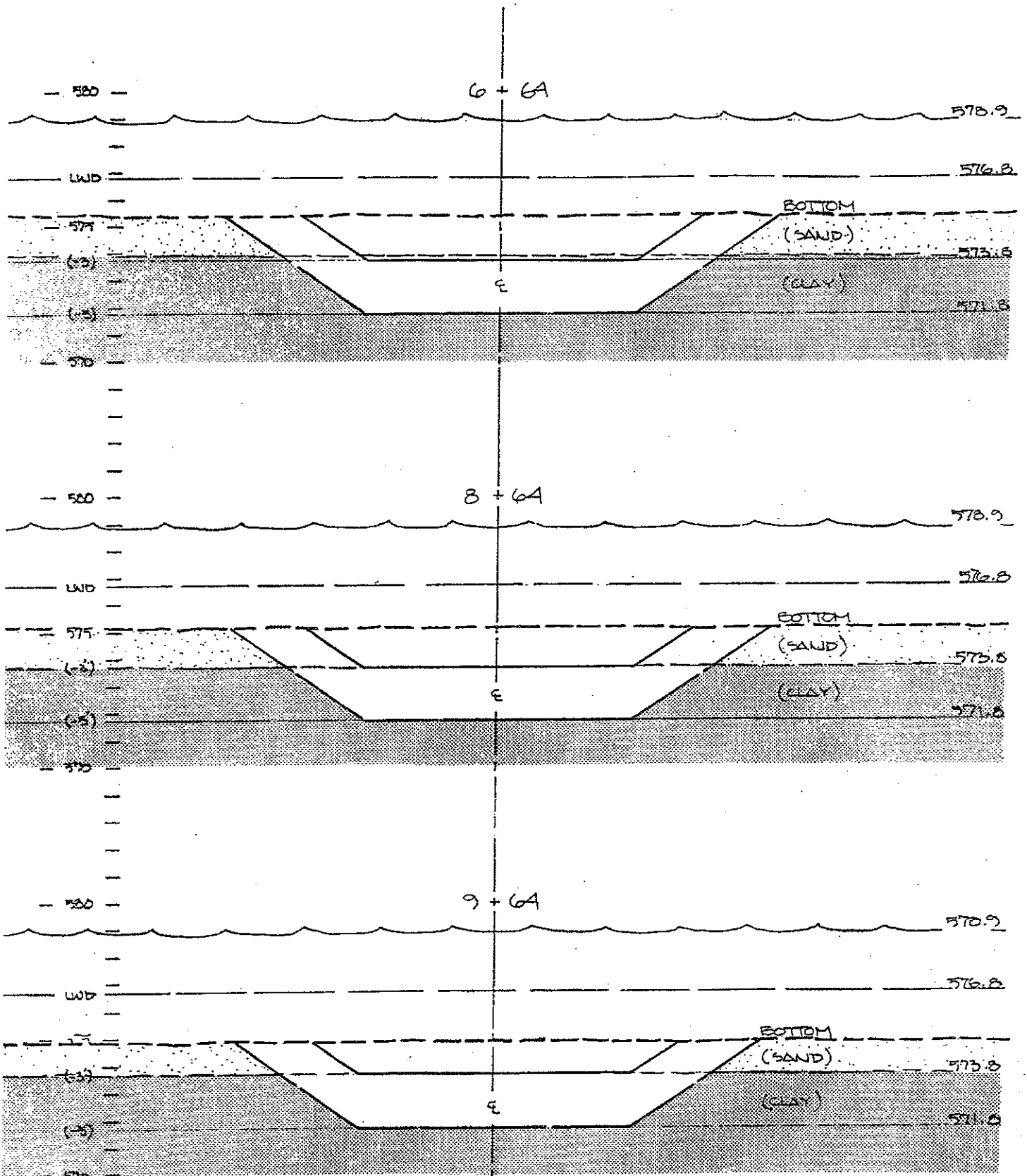
NOTE - BOTTOM CONDITIONS DETERMINED USING PEAT ROD

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
0 + 80	0.0' - 2.0'	WATER	
	2.0' - 3.0'	SAND	
	3.0' - 4.0' +	BLUE CLAY, REFUSAL AT 4.0'	
3 + 00	0.0' - 2.6'	WATER	
	2.6' - 3.6'	SAND	
	3.6' - 5.0' +	BLUE CLAY, REFUSAL AT 5.0'	
6 + 00	0.0' - 3.8'	WATER	
	3.8' - 4.3'	SAND	
	4.3' - 5.3' +	BLUE CLAY, REFUSAL AT 5.3'	
9 + 00	0.0' - 4.0'	WATER	
	4.0' - 4.5'	SAND	
	4.5' - 5.5' +	BLUE CLAY, REFUSAL AT 5.5'	
38 + 00	0.0' - 3.2'	WATER	
	3.2' - 6.2'	SAND	
	6.2' +	CLAY REFUSAL AT 6.2'	
44 + 00	0.0' - 2.8'	WATER	
	2.8' - 6.0'	SAND	
	6.0' +	CLAY REFUSAL AT 6.0'	
54 + 00	0.0' - 3.5'	WATER	
	3.5' - 7.0'	SAND	
	7.0' +	CLAY REFUSAL AT 7.0'	
64 + 00	0.0' - 4.5'	WATER	
	4.5' - 7.0'	SAND	
	7.0' +	CLAY REFUSAL AT 7.0'	

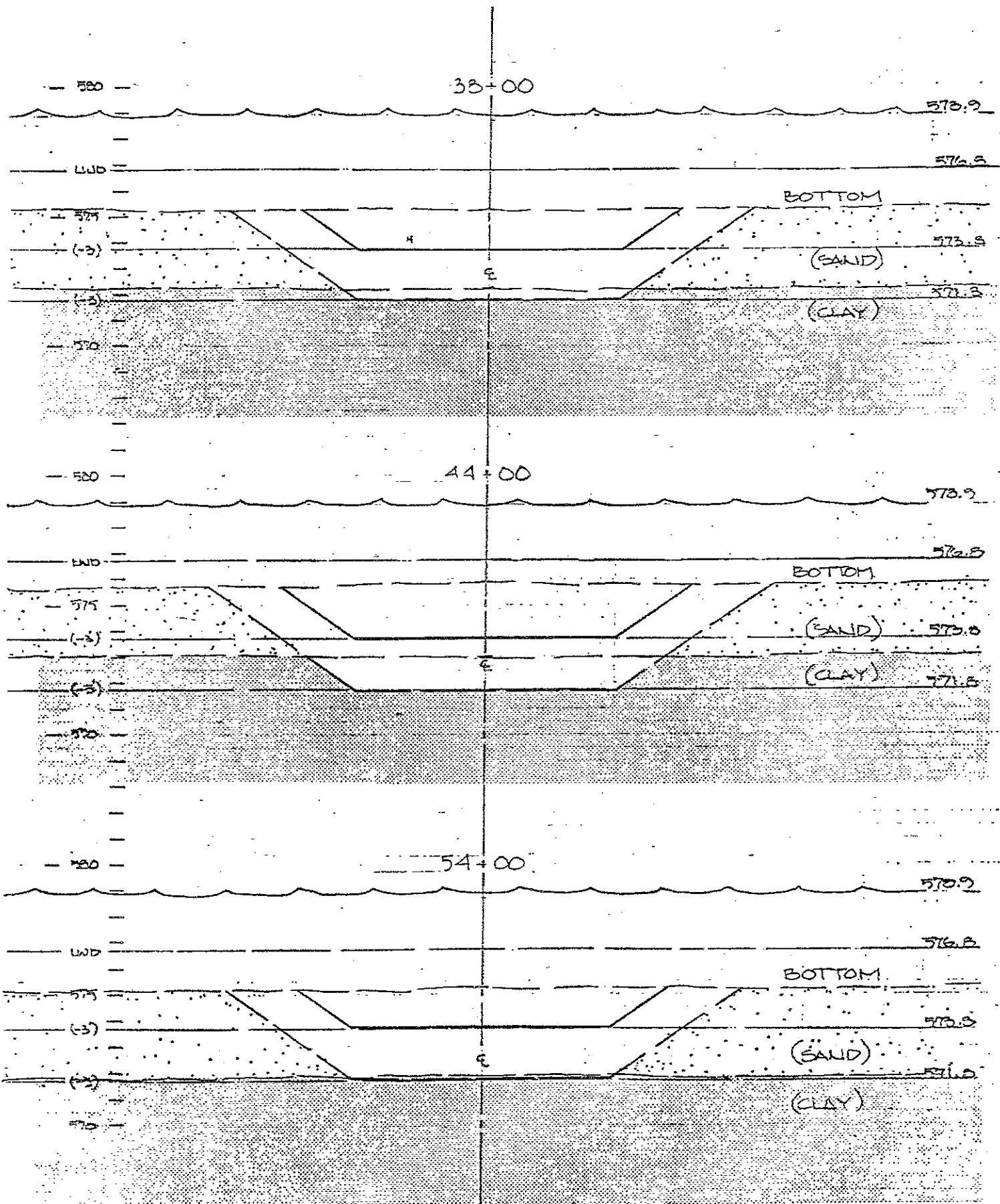
PINCONNING S.P.



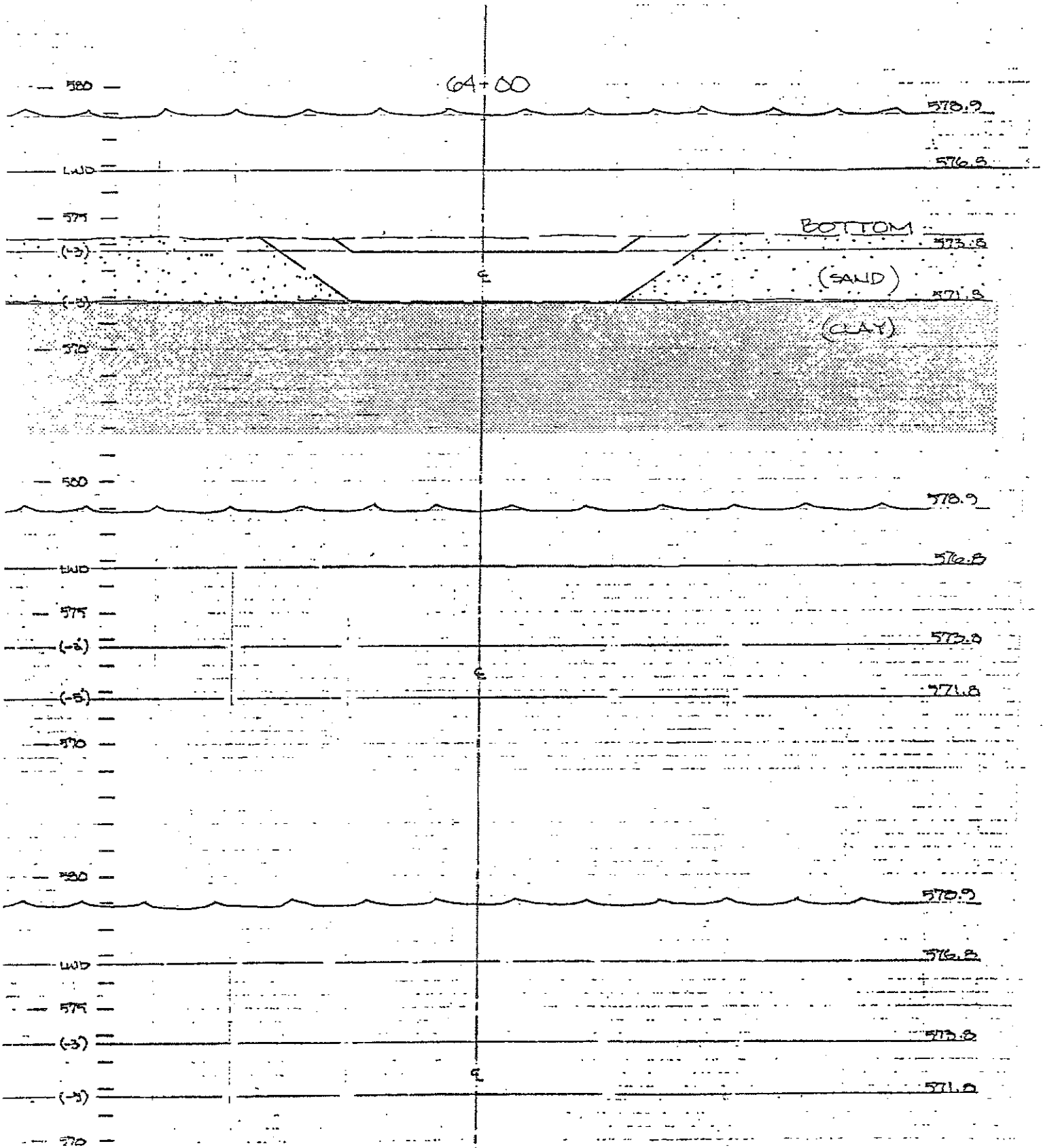
PINCONNING S. P.



PINCONNING S.P.



PINCONNING S.P.



EARTHWORK - PINCONNING

- (40' WIDE TOE OF CHANNEL 3.0' BELOW LWD)

AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

STATION	AREA	STATION	AREA	DISTANCE	VOLUME (CU. YD.)
0 + 64	151	2 + 64	112	200	974
2 + 64	112	4 + 64	92	"	755
4 + 64	92	6 + 64	76	"	622
6 + 64	76	8 + 64	67	"	529
8 + 64	67	9 + 64	52	100	220
9 + 64	52	13 + 00	0	336	323
13 + 00	0	32 + 00	0	1900	0
32 + 00	0	38 + 00	75	600	833
38 + 00	75	44 + 00	111	600	2066
44 + 00	111	54 + 00	73	1000	3407
54 + 00	73	64 + 00	22	1000	1759
64 + 00	22	69 + 00	0	500	203
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—

TOTAL DREDGING TO 3.0' BELOW LWD 11,690 CU. YD.

[11,140 CY SAND
550 CY CLAY]

EARTHWORK - PINCONNING

(40' WIDE TOE OFF CHANNEL 5.0' BELOW LWD)

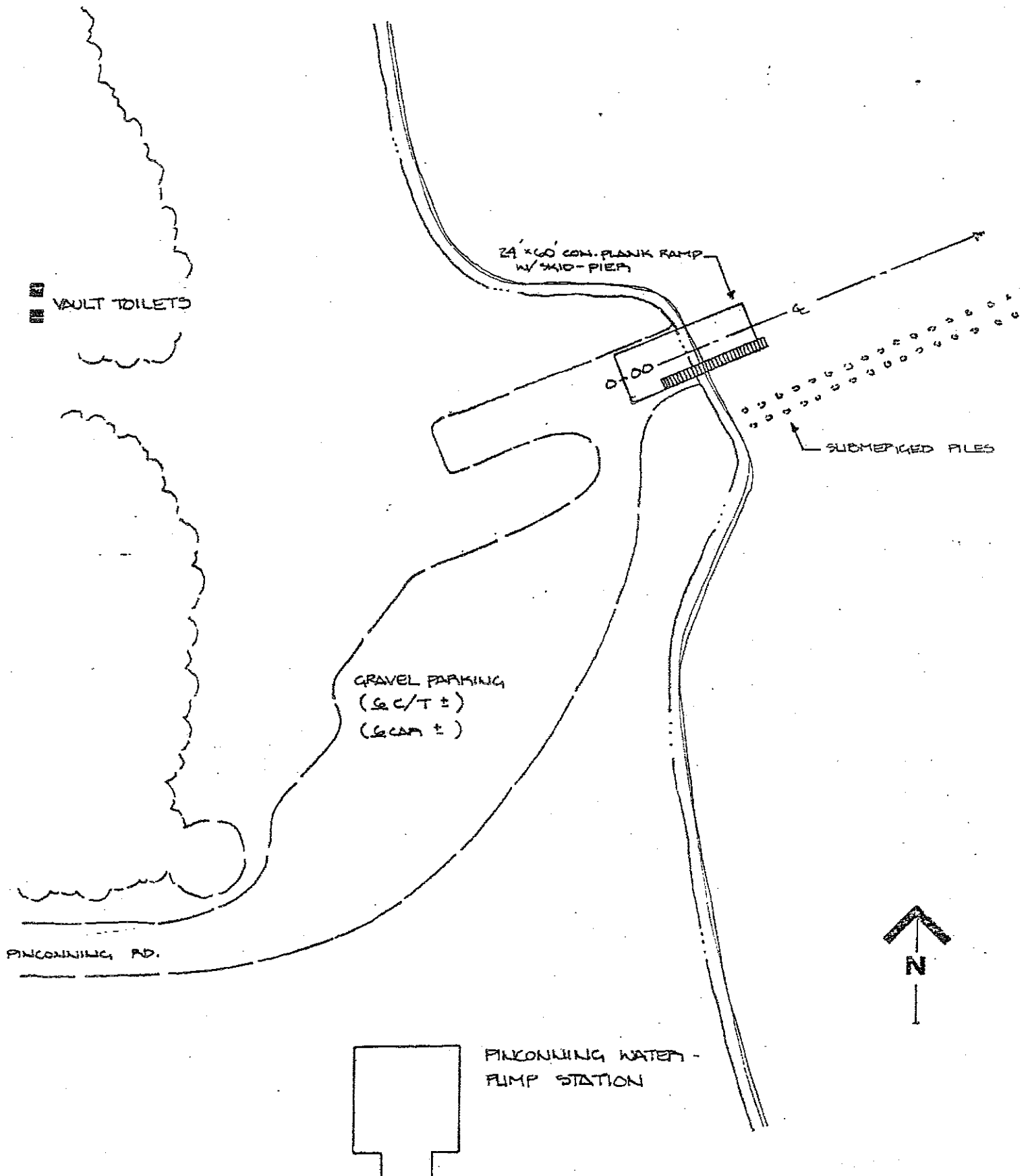
AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

STATION	AREA	STATION	AREA	DISTANCE	VOLUME (CU. YD.)
0 + 64	280	2 + 64	233	200'	1900
2 + 64	233	4 + 64	208	"	1633
4 + 64	208	6 + 64	188	"	1466
6 + 64	188	8 + 64	178	"	1355
8 + 64	178	9 + 64	160	100'	625
9 + 64	160	13 + 00	80	336	1493
13 + 00	80	32 + 00	80	1900	5629
32 + 00	80	38 + 00	213	600	3255
38 + 00	213	44 + 00	533	600	8288
44 + 00	533	54 + 00	213	1000	13814
54 + 00	213	64 + 00	137	1000	6481
64 + 00	137	69 + 00	0	500	1268
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—

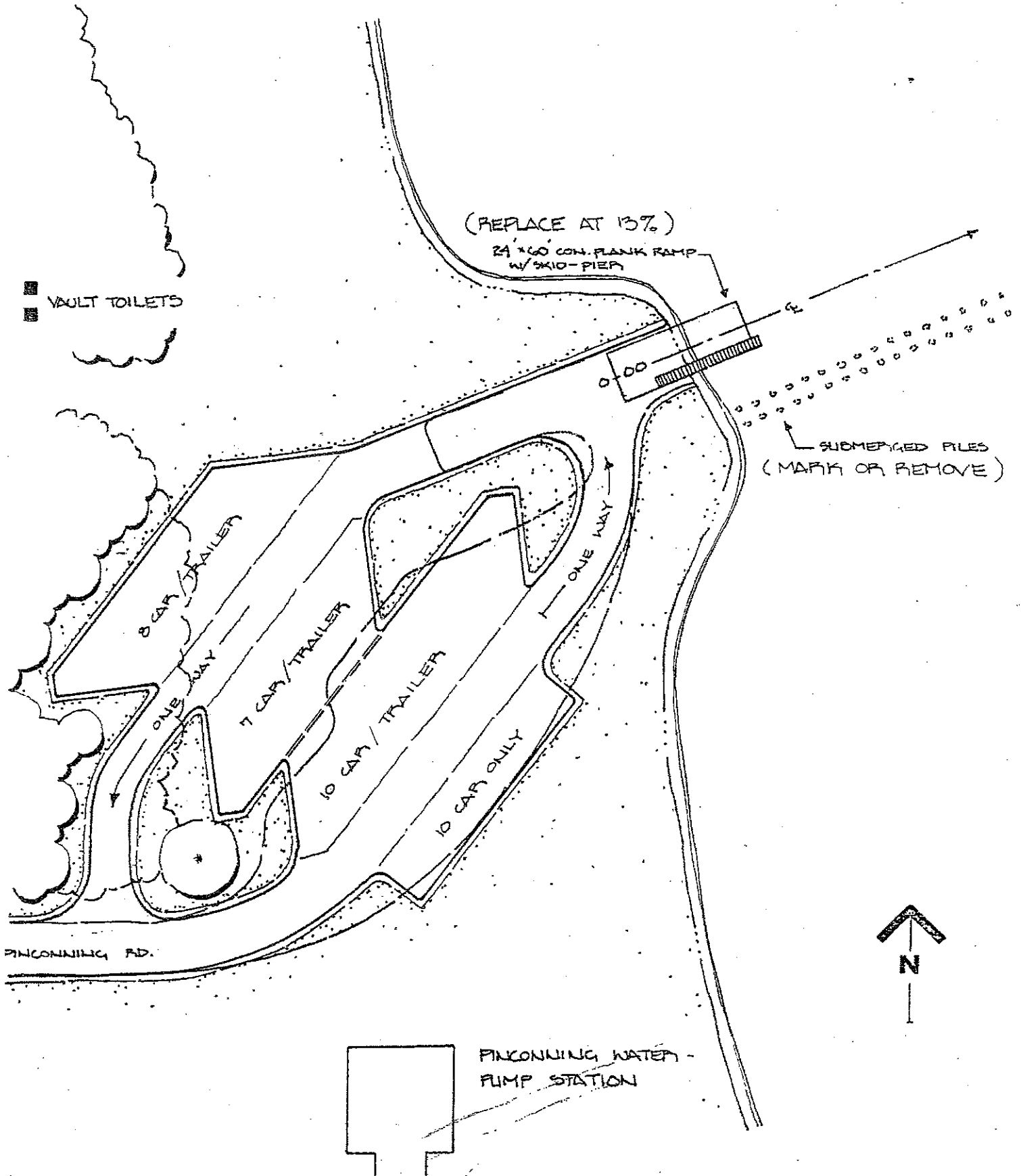
TOTAL DREDGING TO 5.0' BELOW LWD 47,200 CU. YD.

[39,240 CY SAND
7,960 CY CLAY]

PINCONNING S.P.
(EXISTING)



PINCONNING S.P.
(PROPOSED)



QUANTITY / COST ESTIMATE

PINCONNING S.P.

WORK BY CONTRACT - CHANNEL

DREDGE, WASTE ON SITE	11,690 CY @ \$5.00...	\$58,450
	10% CONTINGENCY	<u>5,845</u>
	SUB-TOTAL	\$ 64,295

WORK BY STATE - PARKING AND RAMP

CLEARING	800 SY @ 1.00...	800
SAND FILL (FROM DREDGE)	1,200 CY @ .50...	600
22 A GRAVEL	500 CY @ 12.00...	6,000
GRADE OFF WASTE	10,490 CY @ .50...	5,245
CONCRETE CURB	60 EA @ 25.00...	1,500
WOOD POSTS	25 EA @ 15.00...	375
24 x 60' CONCRETE PLANK RAMP	LUMP SUM	4,000
CHANNEL MARKERS	LUMP SUM	800
SUBMERGED PILE MARKERS	LUMP SUM	600
MOBILIZATION	LUMP SUM	<u>1,500</u>
		21,420
	10% CONTINGENCY	<u>2,142</u>
	SUB-TOTAL	\$ 23,560

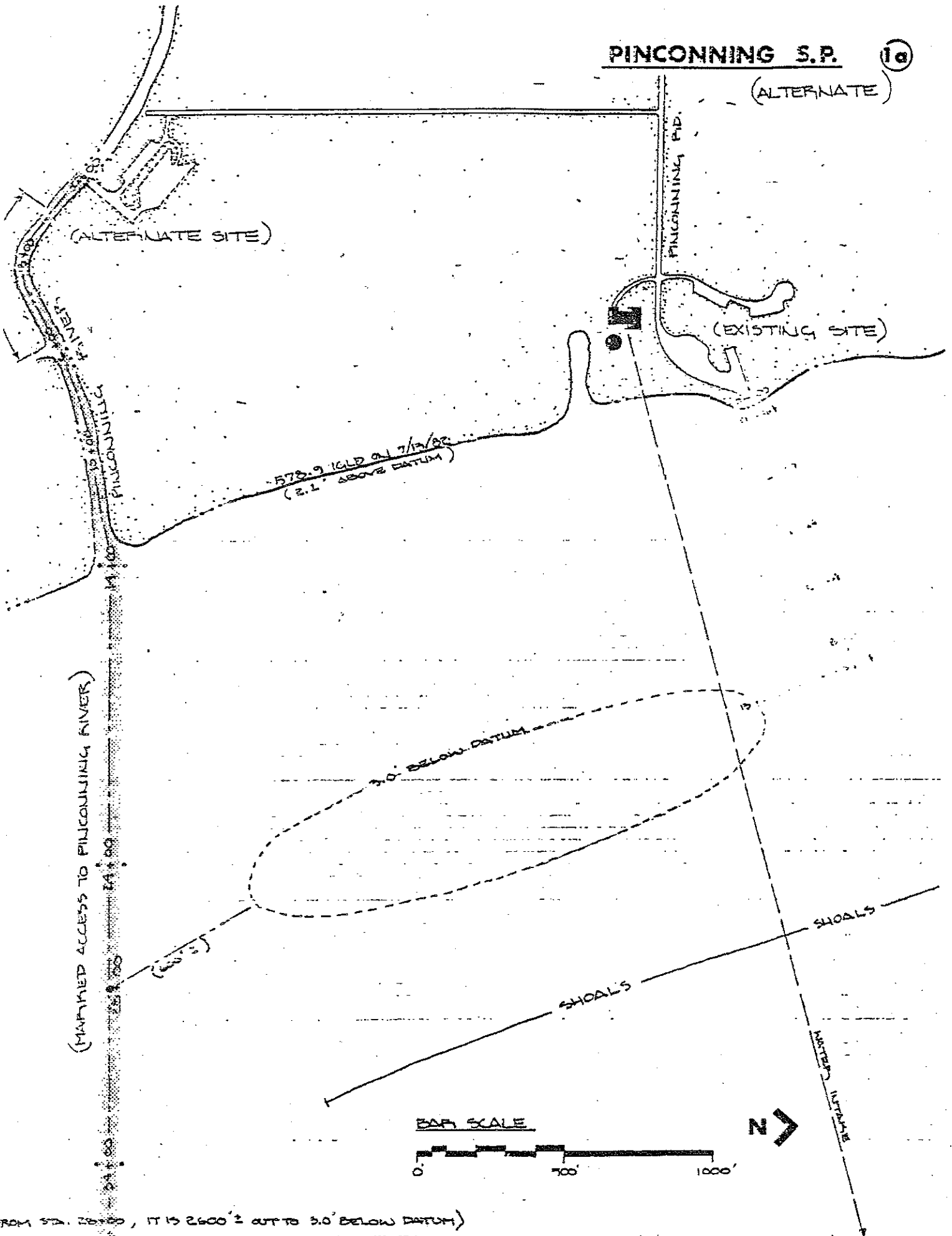
TOTAL PROJECT COST \$ 87,860

[NOTE ... TO DREDGE CHANNEL TO 5.0' BELOW LOW WATER DATUM ADD \$ 125,300 TO THE TOTAL PROJECT COST]

PINCONNING S.P.

(1a)

(ALTERNATE)



FROM STA. 20+00, IT IS 2600' 2 OUT TO 3.0' BELOW DATUM)

Pinconning State Park is bounded to the south by the Pinconning River. The State Park property on the river was investigated as an alternate location for boating access.

The site is approximately 1,400 feet upstream (west) from the river mouth, with access from Two Mile Road. The river is shallow (present depths of 2.5-3.0 feet) and ranges in width from 50 to 60 feet. On the south side of the river is a private marina approximately 1,000 feet upstream from the river mouth.

Development of this alternate site would require dredging and maintaining a channel approximately 1,400 feet to the river mouth and an additional 4,000 feet out into the lake to reach a water depth of three feet below low water datum. A large amount of fill would be required for parking and roads on the low land along the river. Were boaters to utilize this site, they would have to pass by the private marina on their way to and from Saginaw Bay, with the possibility of conflict likely.

The proposed improvements at the site would involve a 24 foot by 60 foot concrete plank ramp with a skid pier, parking for 25 car and trailers and 10 cars, a vault type toilet and the above detailed dredging.

The channel and river dredging would be done on a contract basis. The Waterways Division construction crew would construct the site improvements. The project could be completed in one construction season.

No major problems are expected in the construction of this project.

SOUNDINGS - PINCONNING
(ALTERNATE)

WATER SURFACE EL. 578.9 IGLD ON 7/13/82

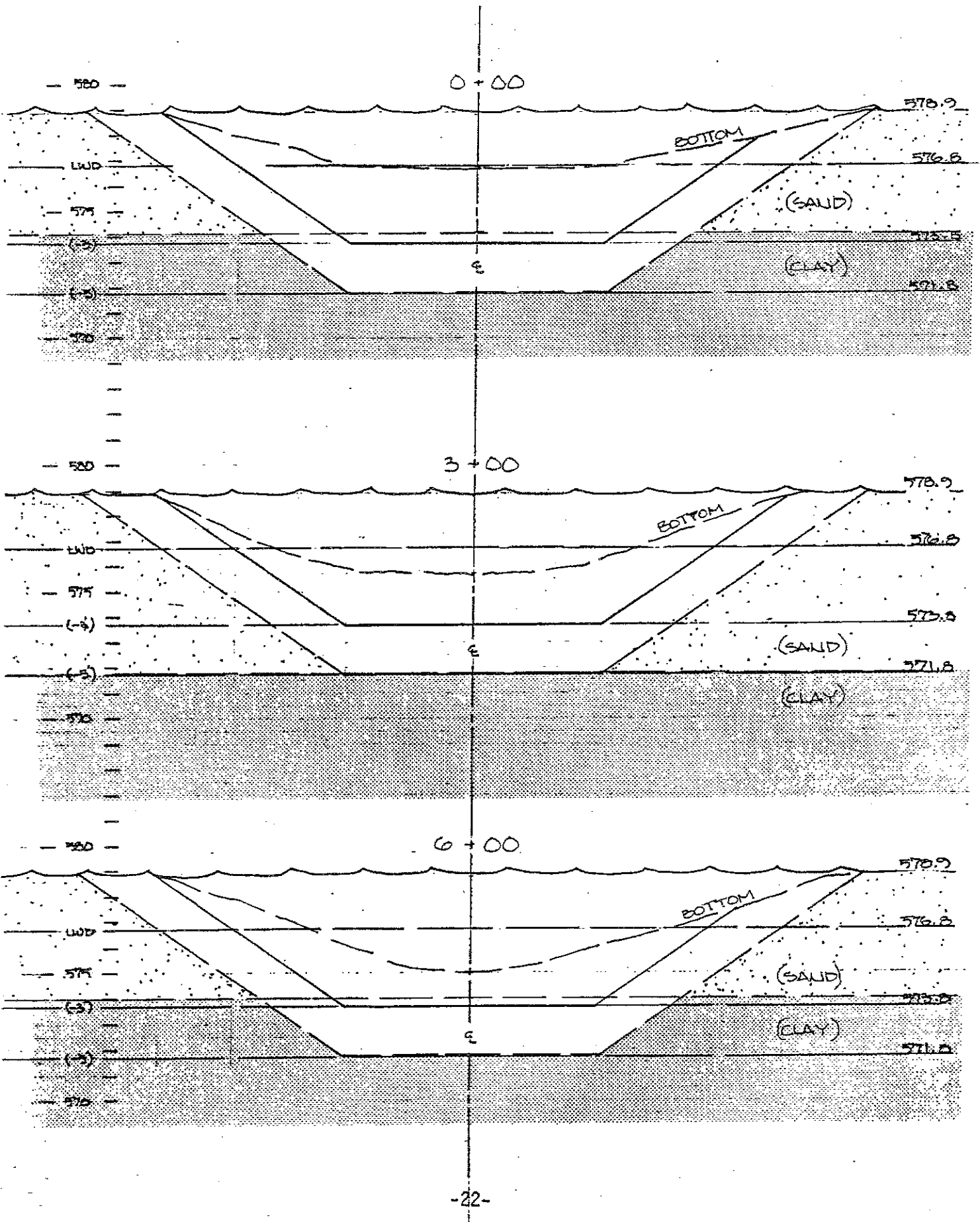
<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
<u>0 + 00</u>	<u>2.5'</u>	<u>SAND / SILT</u>	<u>♀ PINCONNING R.</u>
<u>3 + 00</u>	<u>3.0'</u>	<u>" "</u>	<u>" " "</u>
<u>6 + 00</u>	<u>3.8'</u>	<u>" "</u>	<u>" " "</u>
<u>10 + 00</u>	<u>3.0'</u>	<u>" "</u>	<u>" " "</u>
<u>14 + 00</u>	<u>3.5'</u>	<u>" "</u>	<u>" " " @ MOUTH</u>
<u>24 + 00</u>	<u>3.5'</u>	<u>SAND</u>	<u>OPEN WATER</u>
<u>28 + 00</u>	<u>3.2'</u>	<u>" "</u>	<u>" "</u>
<u>34 + 00</u>	<u>2.8'</u>	<u>" "</u>	<u>" "</u>
<u>44 + 00</u>	<u>3.5'</u>	<u>" "</u>	<u>" "</u>
<u>54 + 00</u>	<u>4.5'</u>	<u>" "</u>	<u>" "</u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>

PROBINGS - PINCONNING
(ALTERNATE)

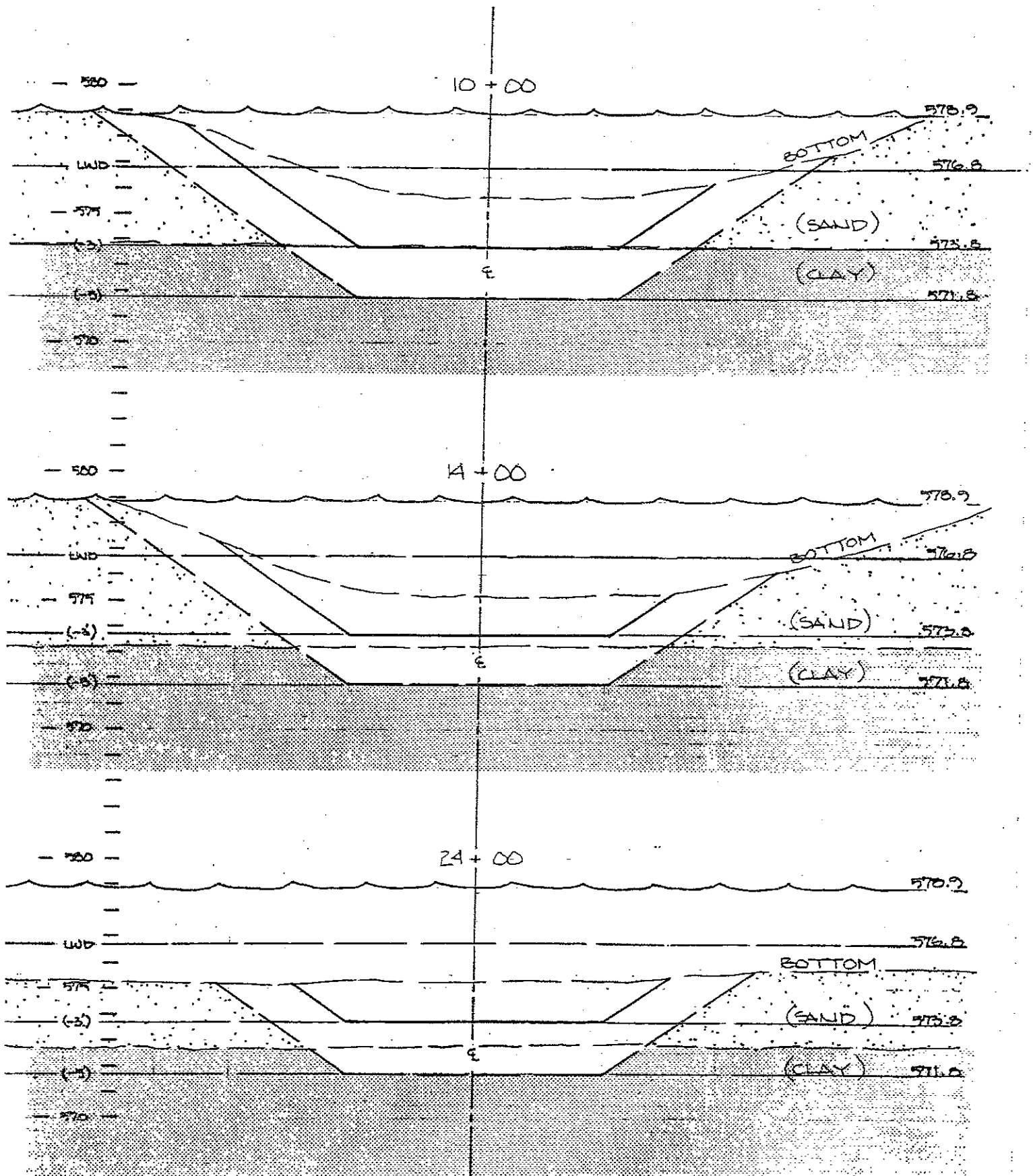
WATER SURFACE EL. 578.9 ICID ON 7/13/82

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
0 + 00	0.0' - 2.5'	WATER	
	2.5' - 5.0'	SAND/SILT	
	5.0' +	CLAY	REFUSAL AT 5.0'
3 + 00	0.0' - 3.0'	WATER	
	3.0' - 4.0'	SAND/SILT	
	4.0' +	CLAY	REFUSAL AT 4.0'
6 + 00	0.0' - 3.8'	WATER	
	3.8' - 4.8'	SAND/SILT	
	4.8' +	CLAY	REFUSAL AT 4.8'
10 + 00	0.0' - 3.0'	WATER	
	3.0' - 5.0'	SAND/SILT	
	5.0' +	CLAY	REFUSAL AT 5.0'
14 + 00	0.0' - 3.5'	WATER	
	3.5' - 5.5'	SAND/SILT	
	5.5' +	CLAY	REFUSAL AT 5.5'
24 + 00	0.0' - 3.5'	WATER	
	3.5' - 6.0'	SAND	
	6.0' +	CLAY	REFUSAL AT 6.0'
28 + 00	0.0' - 3.2'	WATER	
	3.2' - 6.2'	SAND	
	6.2' +	CLAY	REFUSAL AT 6.2'
34 + 00	0.0' - 2.8'	WATER	
	2.8' - 6.0'	SAND	
	6.0' +	CLAY	REFUSAL AT 6.0'
44 + 00	0.0' - 3.5'	WATER	
	3.5' - 7.0'	SAND	
	7.0' +	CLAY	REFUSAL AT 7.0'
54 + 00	0.0' - 4.5'	WATER	
	4.5' - 7.0'	SAND	
	7.0' +	CLAY	REFUSAL AT 7.0'

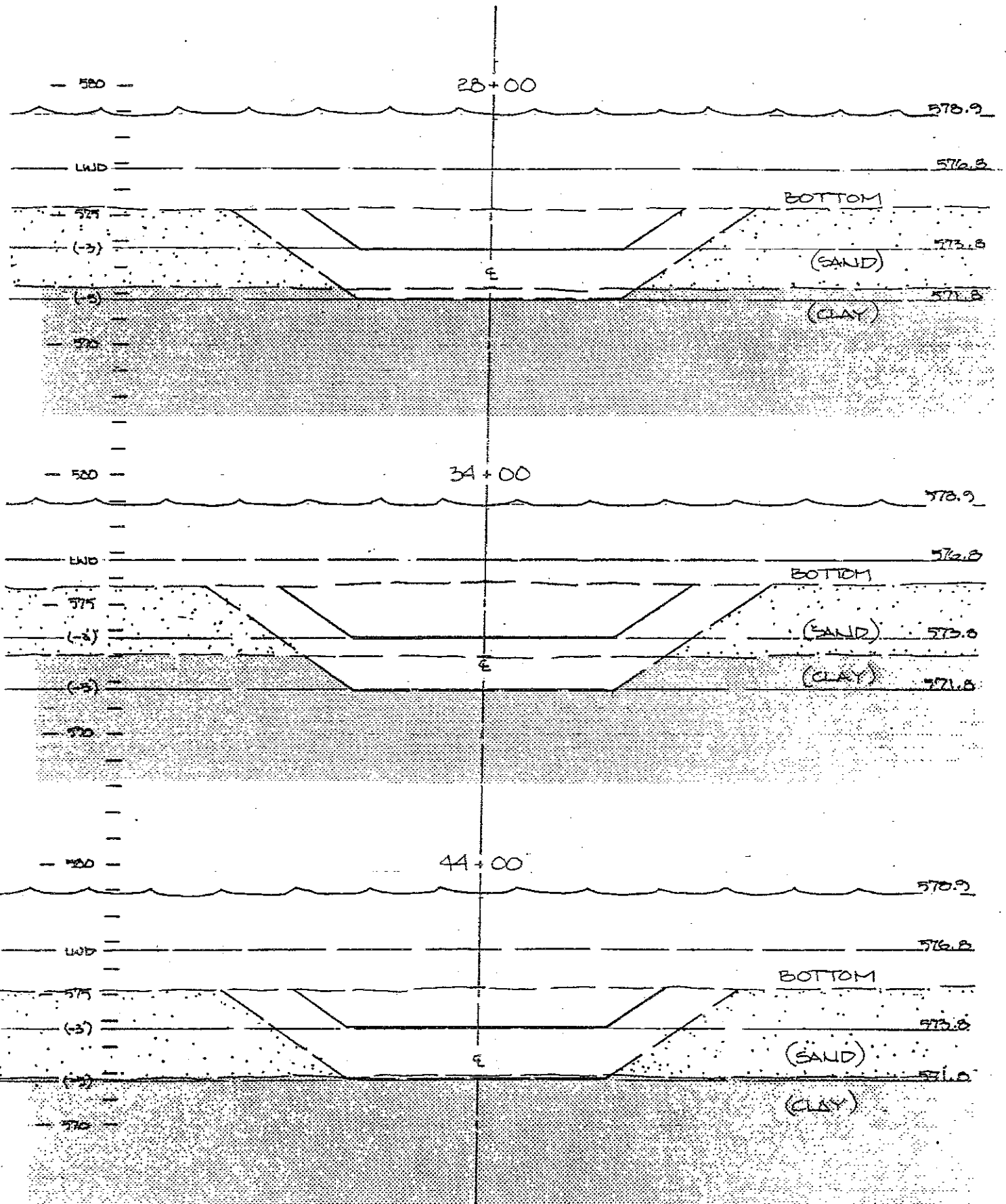
PINCONNING S. P.
(ALTERNATE)



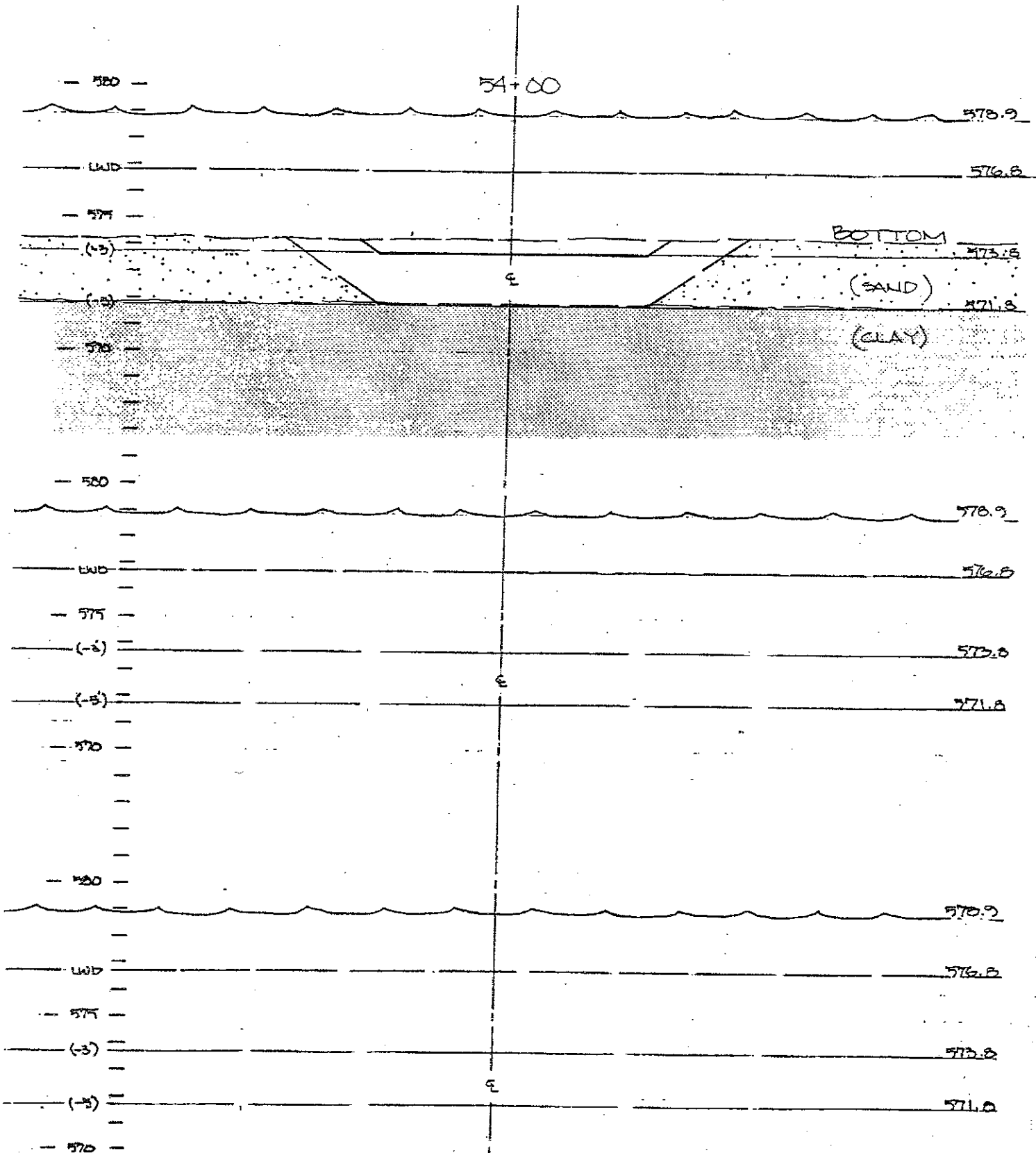
PINCONNING S.P. (ALTERNATE)



PINCONNING S. P.
(ALTERNATE)



PINCONNING S. P.
(ALTERNATE)



(40' WIDE TOE OF CHANNEL 3' BELOW LWD)

[illegible]

20,970 CY SAND
250 CY CLAY

PINCONNING - ALTERNATE

EARTHWORK

(40' WIDE TOE OF CHANNEL 5' BELOW LWD)

AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 =$ VOLUME IN CUBIC YARDS

STATION	AREA	STATION	AREA	DISTANCE	VOLUME (CU. YD.)
0 + 00	435	3 + 00	350	300	4361
3 + 00	350	6 + 00	350	300	3888
6 + 00	350	10 + 00	352	400	5200
10 + 00	352	14 + 00	308	400	4888
14 + 00	308	24 + 00	220	1000	9777
24 + 00	220	28 + 00	213	400	3207
28 + 00	213	34 + 00	533	600	8288
34 + 00	533	44 + 00	213	1000	13814
44 + 00	213	54 + 00	137	1000	6481
54 + 00	137	59 + 00	0	500	1268
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			
+		+			

TOTAL DREDGING TO 5' BELOW LWD 61,170 CU. YD.

[51,910 CY SAND
9,260 CY CLAY]

QUANTITY / COST ESTIMATE

PINCONNING S.P.
(ALTERNATE)

WORK BY CONTRACT - CHANNEL

. DREDGE, WASTE ON SITE	21,220 CY @ \$5.00	\$106,100
	10% CONTINGENCY	<u>10,610</u>
	SUB-TOTAL	\$116,710

WORK BY STATE - PARKING AND RAMP

. CLEARING	5,000 SY @ 1.00	\$5,000
. SAND FILL (FROM DREDGE)	5,000 CY @ .50	2,500
. 22A GRAVEL	750 CY @ 12.00	9,000
. GRADE OFF WASTE	16,220 CY @ .50	8,110
. CONCRETE CURB	60 EA @ 25.00	1,500
. WOOD POSTS	25 EA @ 15.00	375
. 24 x 60 CONCRETE PLANK RAMP	LUMP SUM	4,000
. MOBILIZATION	LUMP SUM	<u>1,500</u>
		31,985
	10% CONTINGENCY	<u>3,198</u>
	SUB-TOTAL	\$35,180

TOTAL PROJECT COST \$151,890

[NOTE.... TO DREDGE CHANNEL TO 5.0' BELOW LOW WATER
DATUM ADD \$219,730 TO THE TOTAL PROJECT COST]

COGGINS ROAD

2

PUBLIC ACCESS
SITE

578.9 KID ON 7/13/82
(2.1 ABOVE DATUM)

LOW WATER DATUM 576.8

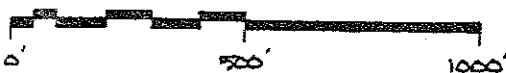
(1.0' BELOW DATUM)

(2.0' BELOW DATUM)

N

(3.0' BELOW DATUM)

BAR SCALE



This site is located in Bay County, two miles east of M-13 and five miles southeast of Pinconning.

In its present condition, this site provides a gravel launch area, undesignated gravel parking for 25 car and trailer units and two vault type toilets. The distance from the existing launch area to three feet below datum is 3,600 feet.

Proposed improvements include construction of a 36 foot by 60 foot concrete plank ramp with a skid pier and designated parking for 45 car and trailer units. In addition, a channel with a 40 foot bottom width would be dredged to three feet below datum. Marker buoys would be placed along the channel.

Both State and Federal permits must be obtained before proceeding with the dredging and construction of the launch ramp.

The channel dredging would be done on a contract basis. The Waterways Division construction crew would install the ramp, construct the parking area and install the channel markers. The project could be completed in one construction season.

Construction of this site should present no major problems. However, local residents claim that existing nearby channels have to be dredged on a yearly basis. If frequent dredging is required, it will add considerably to annual site maintenance costs.

SOUNDINGS - COCKINS

WATER SURFACE EL. 578.9 ICED ON 7/13/82

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
<u>0 + 00</u>	<u>3.2'</u>	<u>0.4' SILT</u>	<u>± 30' CHANNEL AT RAMP</u>
<u>2 + 00</u>	<u>2.7</u>	<u>0.3 SILT</u>	<u>± 40' "</u>
<u>4 + 00</u>	<u>2.7</u>	<u>1.5 SILT/SAND</u>	<u>± 40' " - END TREES SOUTH SPIT</u>
<u>6 + 00</u>	<u>2.0</u>	<u>2.2 SILT/SAND</u>	<u>OPEN WATER</u>
<u>8 + 00</u>	<u>1.7</u>	<u>FIRM SAND/GRAVEL</u>	<u>" "</u>
<u>10 + 00</u>	<u>1.7</u>	<u>1.0 SOFT</u>	<u>" "</u>
<u>12 + 00</u>	<u>2.0</u>	<u>FIRM SAND/GRAVEL</u>	<u>" "</u>
<u>14 + 00</u>	<u>2.2</u>	<u>" "</u>	<u>" "</u>
<u>16 + 00</u>	<u>2.7</u>	<u>" "</u>	<u>" "</u>
<u>18 + 00</u>	<u>2.8</u>	<u>" "</u>	<u>" "</u>
<u>20 + 00</u>	<u>3.0</u>	<u>" "</u>	<u>" "</u>
<u>22 + 00</u>	<u>3.5</u>	<u>" "</u>	<u>" "</u>
<u>24 + 00</u>	<u>3.5</u>	<u>" "</u>	<u>" "</u>
<u>26 + 00</u>	<u>3.5</u>	<u>" "</u>	<u>" "</u>
<u>28 + 00</u>	<u>3.7</u>	<u>" "</u>	<u>" "</u>
<u>30 + 00</u>	<u>4.0</u>	<u>" "</u>	<u>" "</u>
<u>32 + 00</u>	<u>4.0</u>	<u>" "</u>	<u>" "</u>
<u>34 + 00</u>	<u>4.5</u>	<u>" "</u>	<u>" "</u>
<u>36 + 00</u>	<u>5.0</u>	<u>" "</u>	<u>" "</u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>

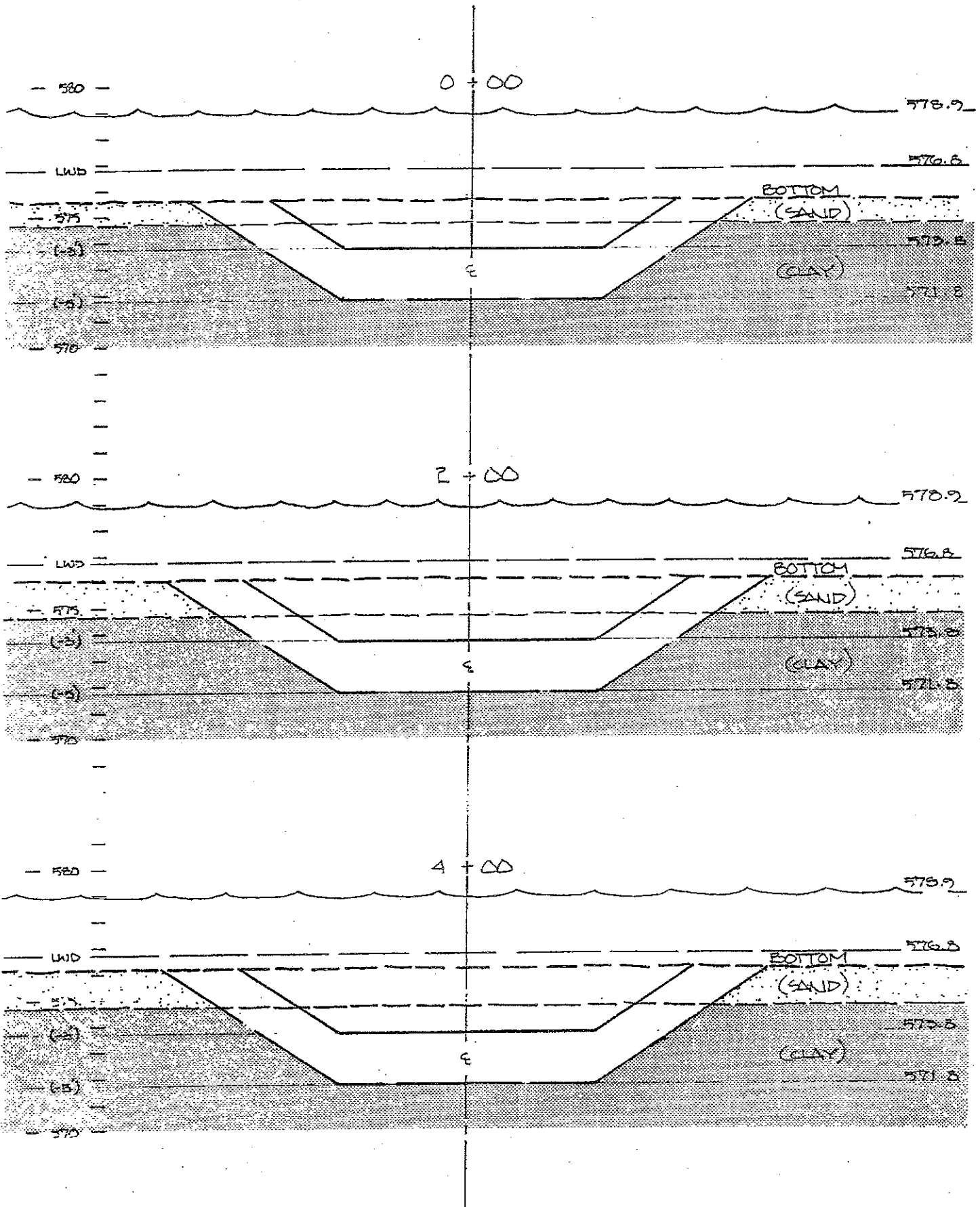
PROBINGS - COCKING

WATER SURFACE EL. 579.1 ICILD ON 8/10/82

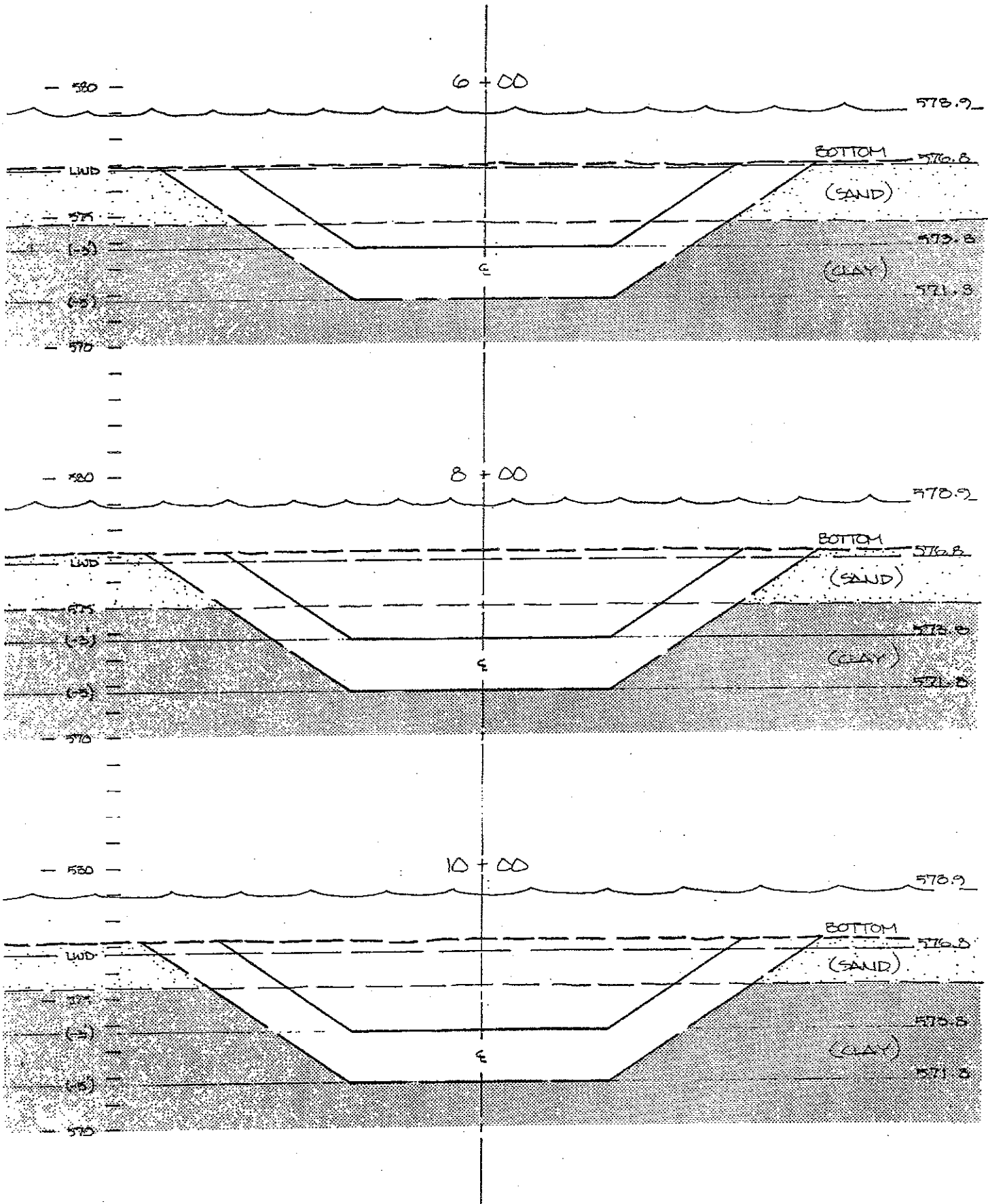
NOTE - BOTTOM CONDITIONS DETERMINED USING PEAT ROD

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
<u>0. + 00</u>	<u>0.0' - 3.5'</u>	<u>WATER</u>	
	<u>3.5' - 4.5'</u>	<u>SAND-GRAVEL</u>	
	<u>4.5' +</u>	<u>CLAY,</u>	<u>REFUSAL AT 4.5'</u>
<u>4. + 50</u>	<u>0.0' - 3.0'</u>	<u>WATER</u>	
	<u>3.0' - 4.5'</u>	<u>SAND-GRAVEL</u>	
	<u>4.5' +</u>	<u>CLAY,</u>	<u>REFUSAL AT 4.5'</u>
<u>10. + 00</u>	<u>0.0' - 2.2'</u>	<u>WATER</u>	
	<u>2.2' - 3.8'</u>	<u>SAND-GRAVEL</u>	
	<u>3.8' +</u>	<u>CLAY,</u>	<u>REFUSAL AT 3.8'</u>
<u>18. + 00</u>	<u>0.0' - 3.0'</u>	<u>WATER</u>	
	<u>3.0' - 4.5'</u>	<u>SAND-GRAVEL</u>	
	<u>4.5' +</u>	<u>CLAY,</u>	<u>REFUSAL AT 4.5'</u>

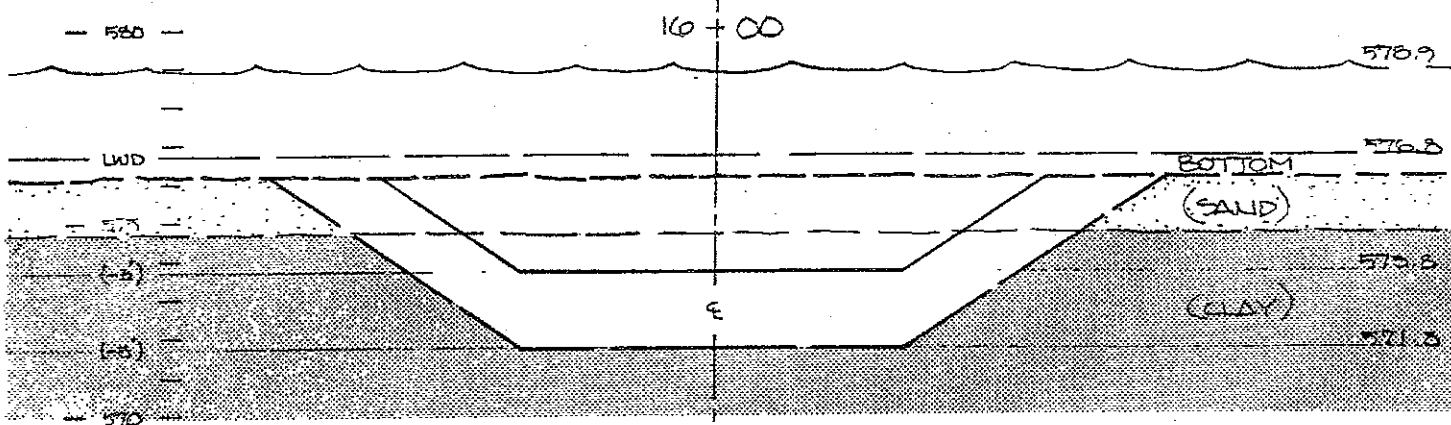
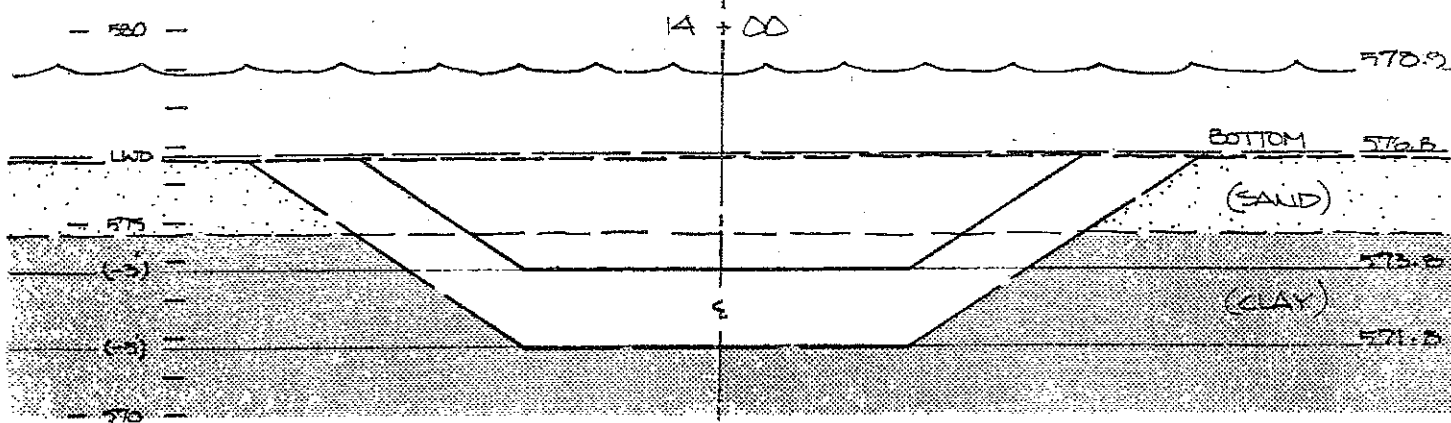
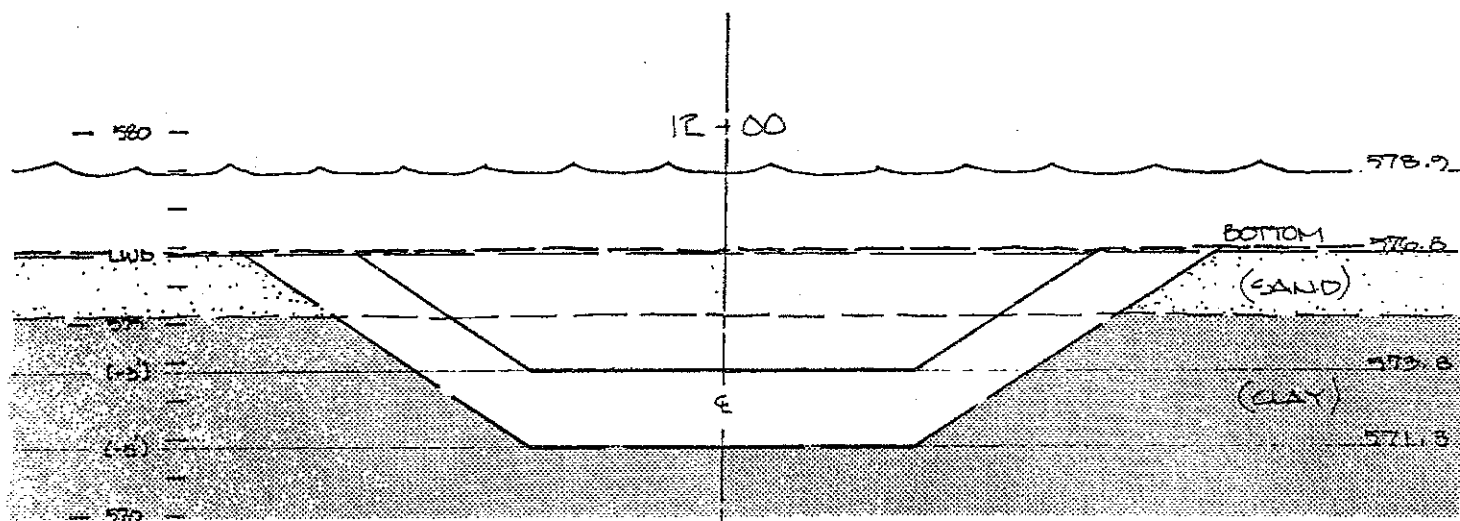
COGGINS ROAD



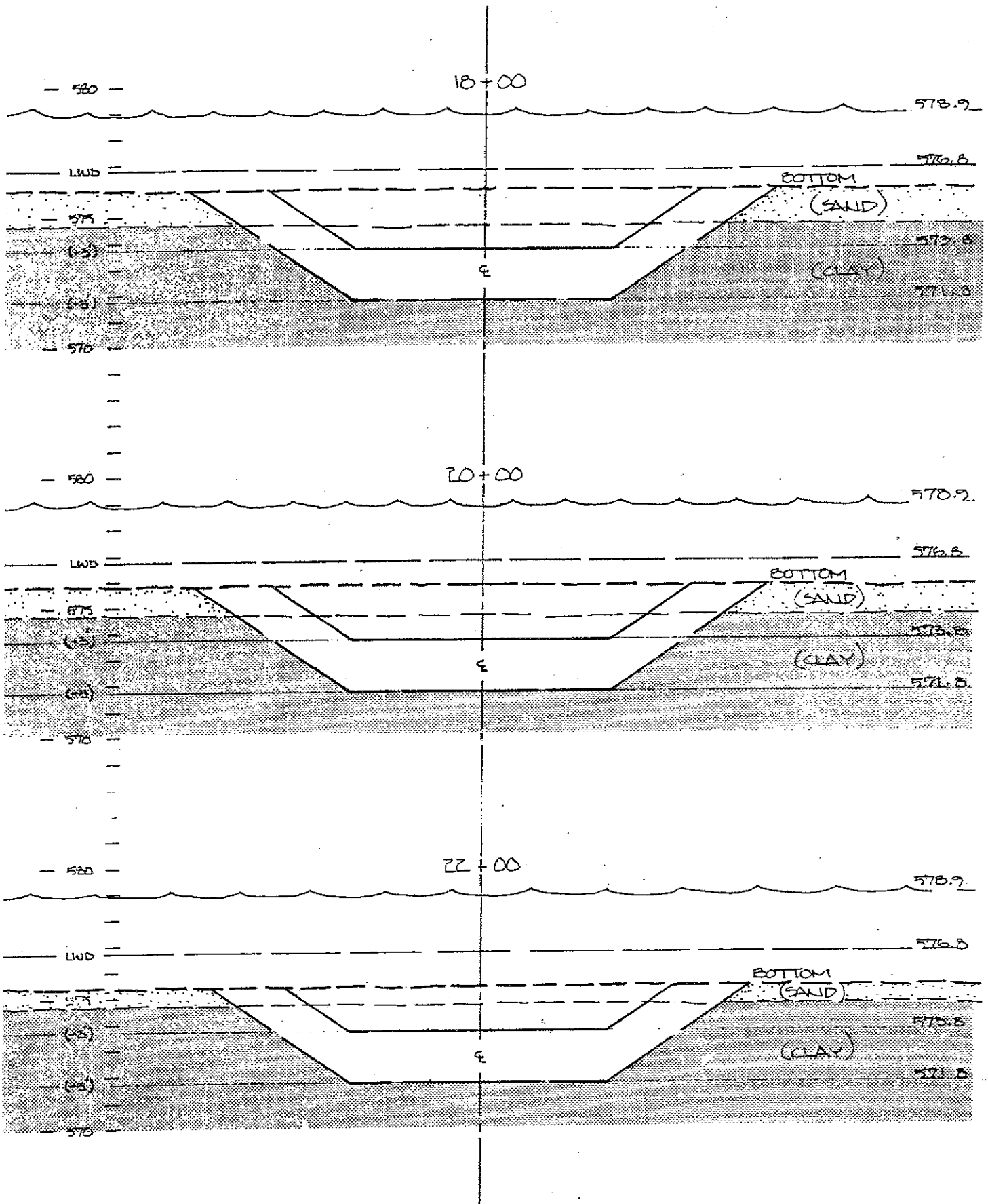
COGGINS ROAD



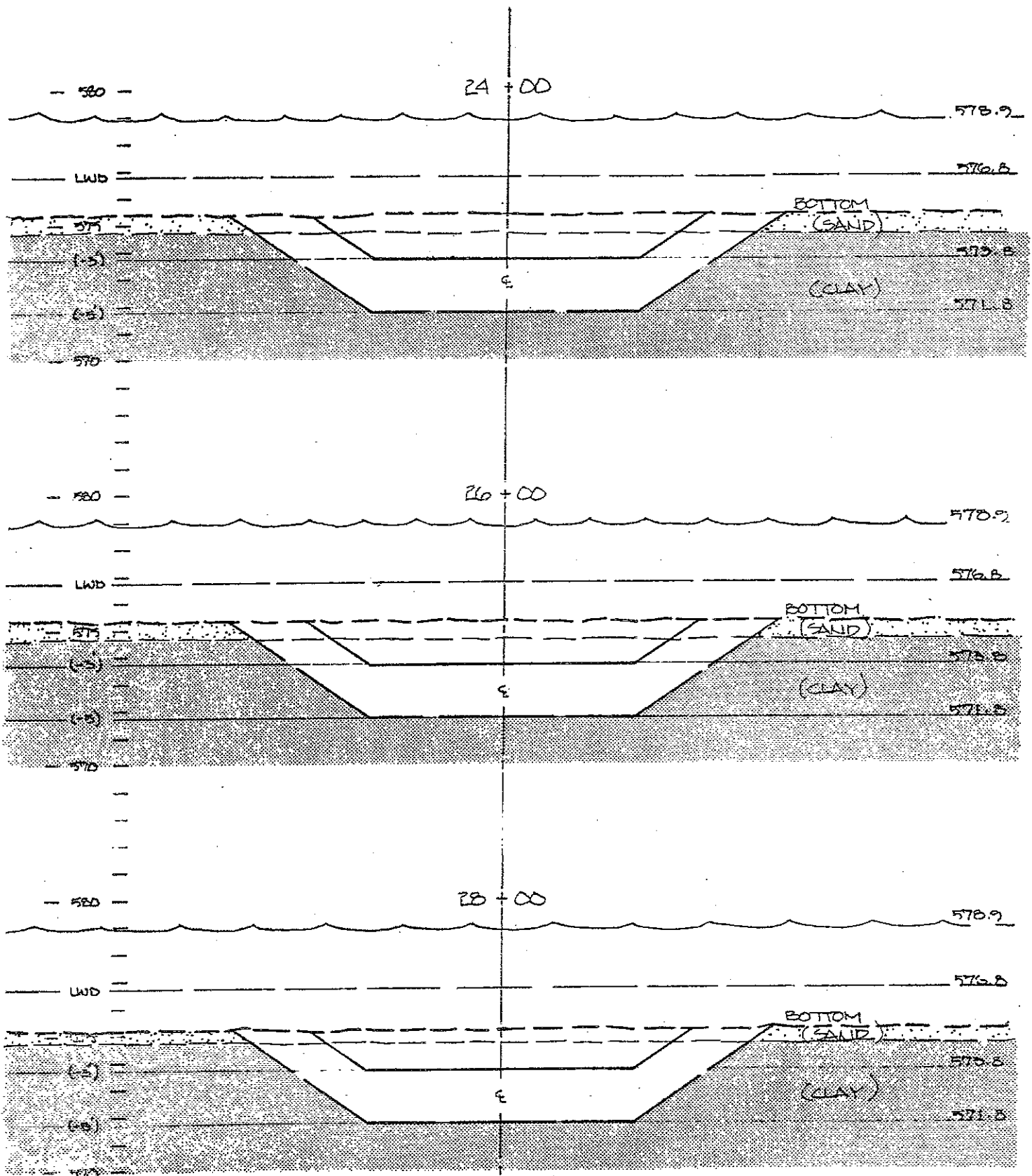
COGGINS ROAD



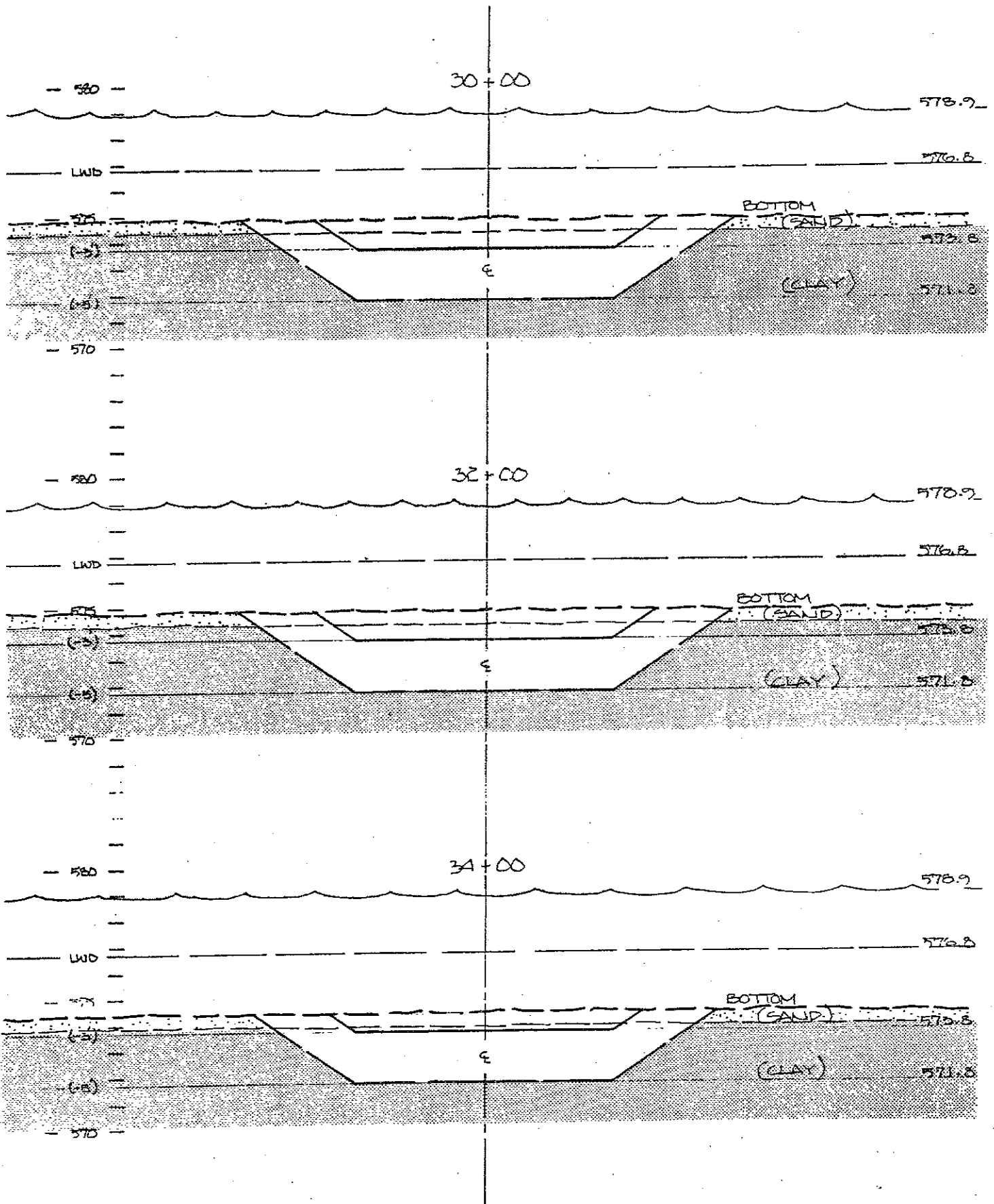
COGGINS ROAD



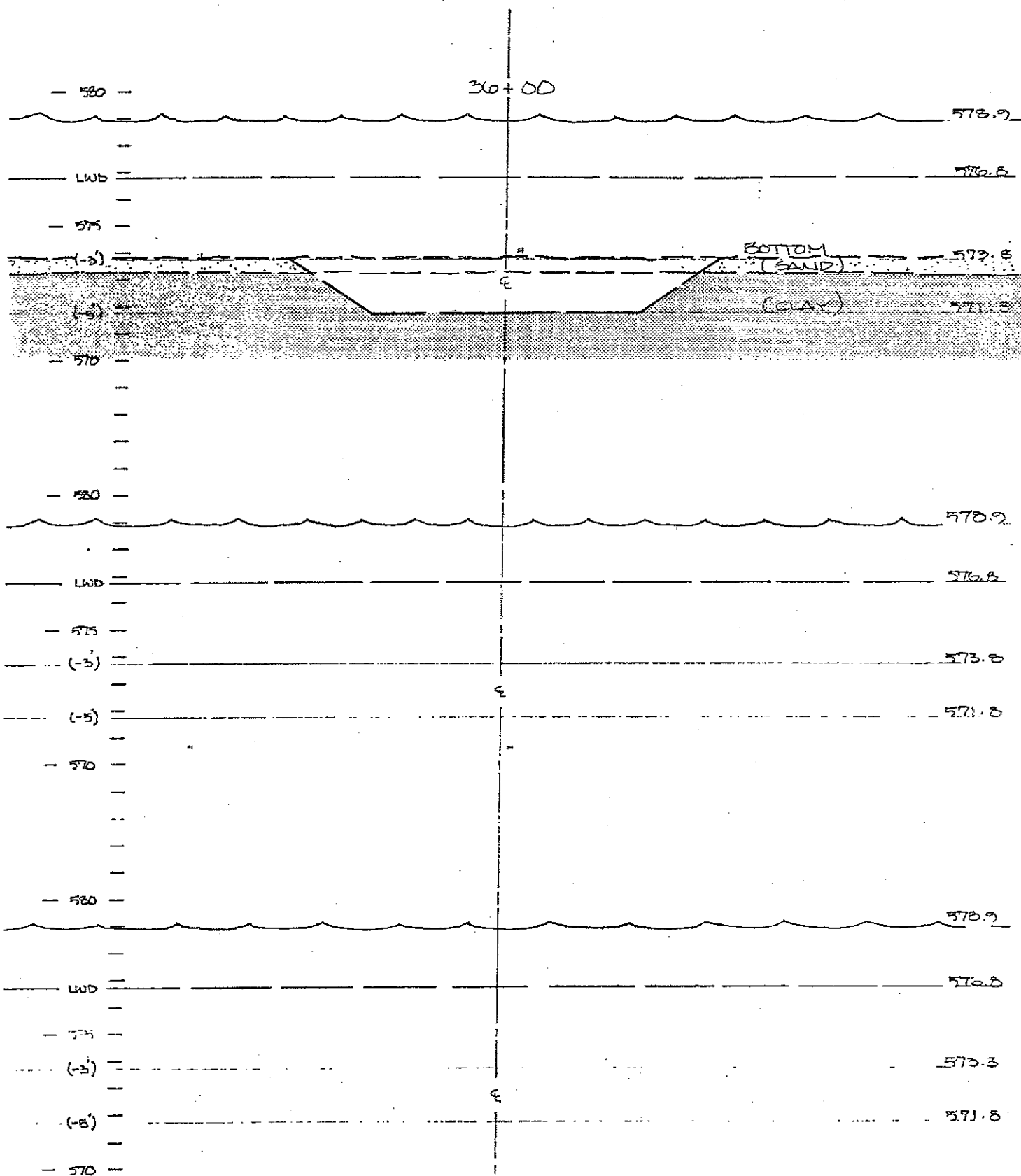
COGGINS ROAD



COGGINS ROAD



COGGINS ROAD



EARTHWORK - COUGINS

(40' WIDE TOE OF CHANNEL 3.0' BELOW LWD)

AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

STATION	AREA	STATION	AREA	DISTANCE	VOLUME (CU. YD.)
0 + 00	88	2 + 00	113	200'	744
2 + 00	113	4 + 00	120	"	863
4 + 00	120	6 + 00	160	"	1037
6 + 00	160	8 + 00	178	"	1252
8 + 00	178	10 + 00	178	"	1318
10 + 00	178	12 + 00	160	"	1251
12 + 00	160	14 + 00	147	"	1137
14 + 00	147	16 + 00	120	"	988
16 + 00	120	18 + 00	108	"	844
18 + 00	108	20 + 00	97	"	759
20 + 00	97	22 + 00	83	"	666
22 + 00	83	24 + 00	77	"	592
24 + 00	77	26 + 00	77	"	570
26 + 00	77	28 + 00	68	"	537
28 + 00	68	30 + 00	53	"	448
30 + 00	53	32 + 00	53	"	392
32 + 00	53	34 + 00	34	"	322
34 + 00	34	36 + 00	0	"	125
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—

TOTAL DREDGING TO 3.0' BELOW LWD 13,850 CU. YD.

[8,350 CY SAND
5,500 CY CLAY]

EARTHWORK - COGGINS

(40' WIDE TOE OF CHANNEL 5.0 BELOW LWD)

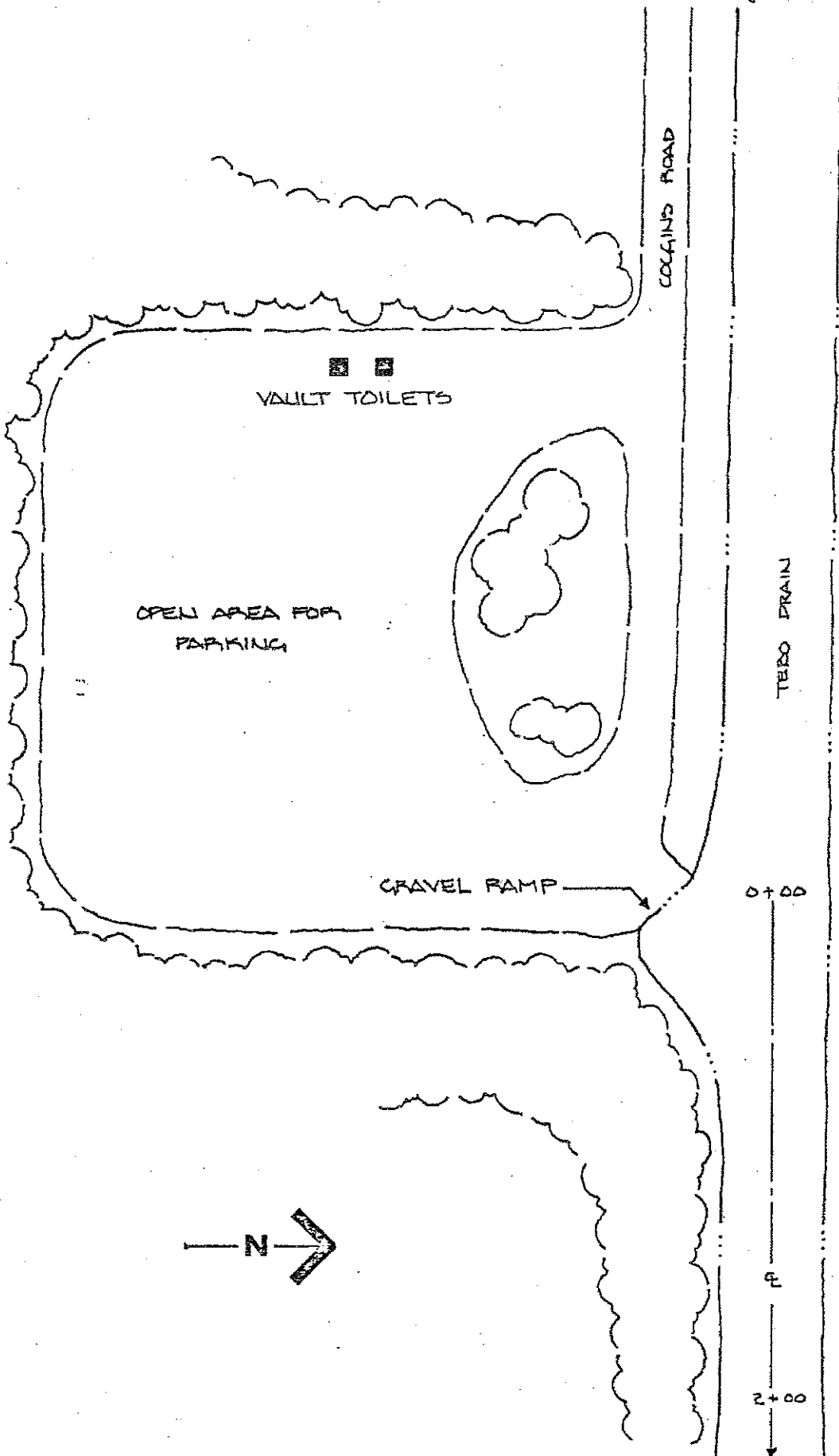
AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

STATION	AREA	STATION	AREA	DISTANCE	VOLUME (CU. YD.)
0 + 00	202	2 + 00	233	200	1611
2 + 00	233	4 + 00	243	"	1762
4 + 00	243	6 + 00	291	"	1977
6 + 00	291	8 + 00	313	"	2237
8 + 00	313	10 + 00	313	"	2318
10 + 00	313	12 + 00	291	"	2237
12 + 00	291	14 + 00	275	"	2096
14 + 00	275	16 + 00	243	"	1918
16 + 00	243	18 + 00	227	"	1740
18 + 00	227	20 + 00	213	"	1629
20 + 00	213	22 + 00	197	"	1518
22 + 00	197	24 + 00	188	"	1425
24 + 00	188	26 + 00	188	"	1392
26 + 00	188	28 + 00	178	"	1355
28 + 00	178	30 + 00	160	"	1251
30 + 00	160	32 + 00	160	"	1185
32 + 00	160	34 + 00	134	"	1088
34 + 00	134	36 + 00	92	"	837
+ —	—	+ —	—	—	—
+ —	—	+ —	—	—	—
+ —	—	+ —	—	—	—

TOTAL DREDGING TO 5.0 BELOW LWD 29,600 CU. YD.

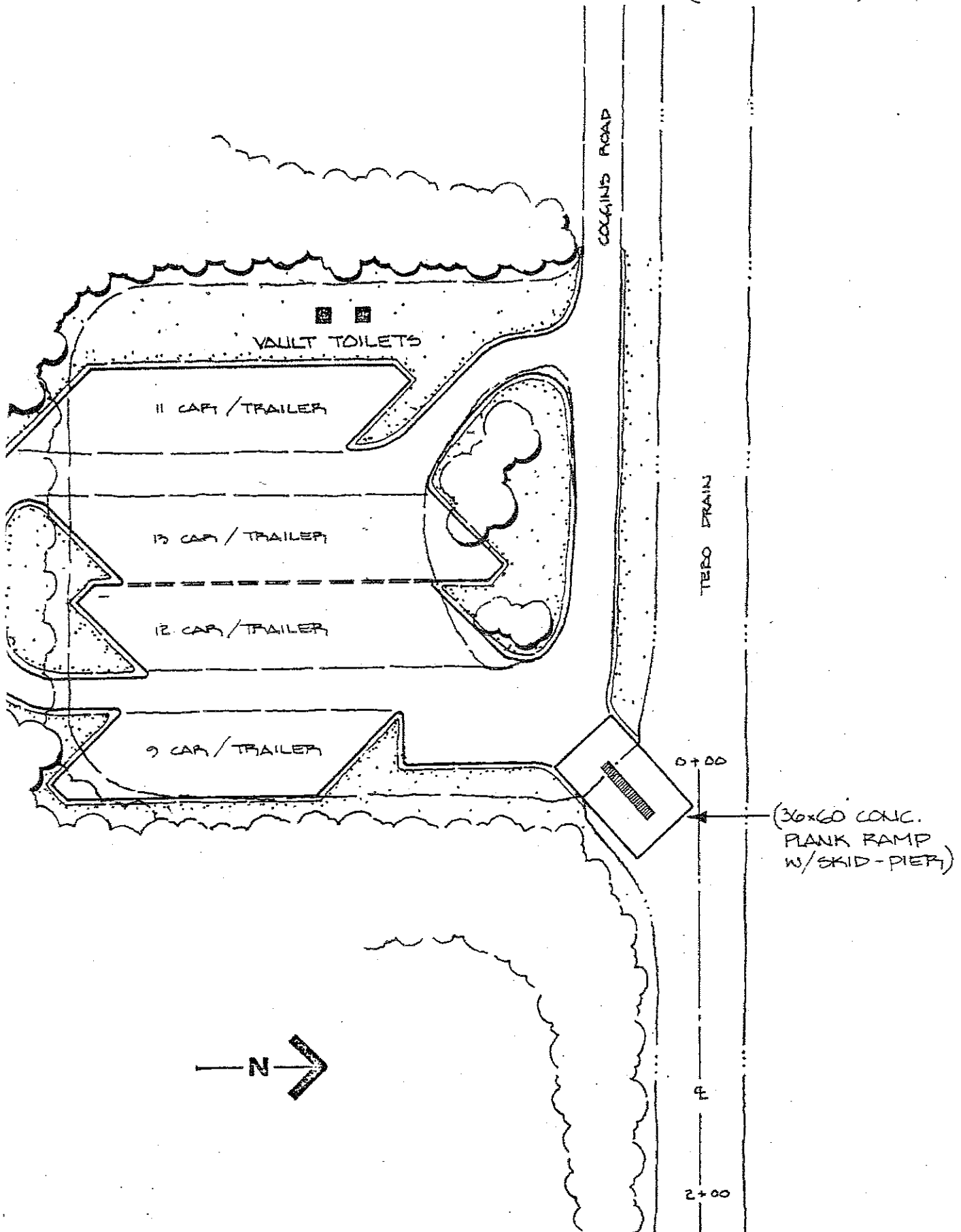
[10,450 CY SAND
19,150 CY CLAY]

COGGINS ROAD
(EXISTING)



COGGINS ROAD

(PROPOSED)



QUANTITY / COST ESTIMATE

COGGINS ROAD

WORK BY CONTRACT - CHANNEL

. DREDGE, WASTE OFF SITE	13,850 CY @ 7 ⁰⁰ ...	\$ 96,950
	10% CONTINGENCY...	<u>9,695</u>
	SUB-TOTAL	\$ 106,645

WORK BY STATE - PARKING AND RAMP

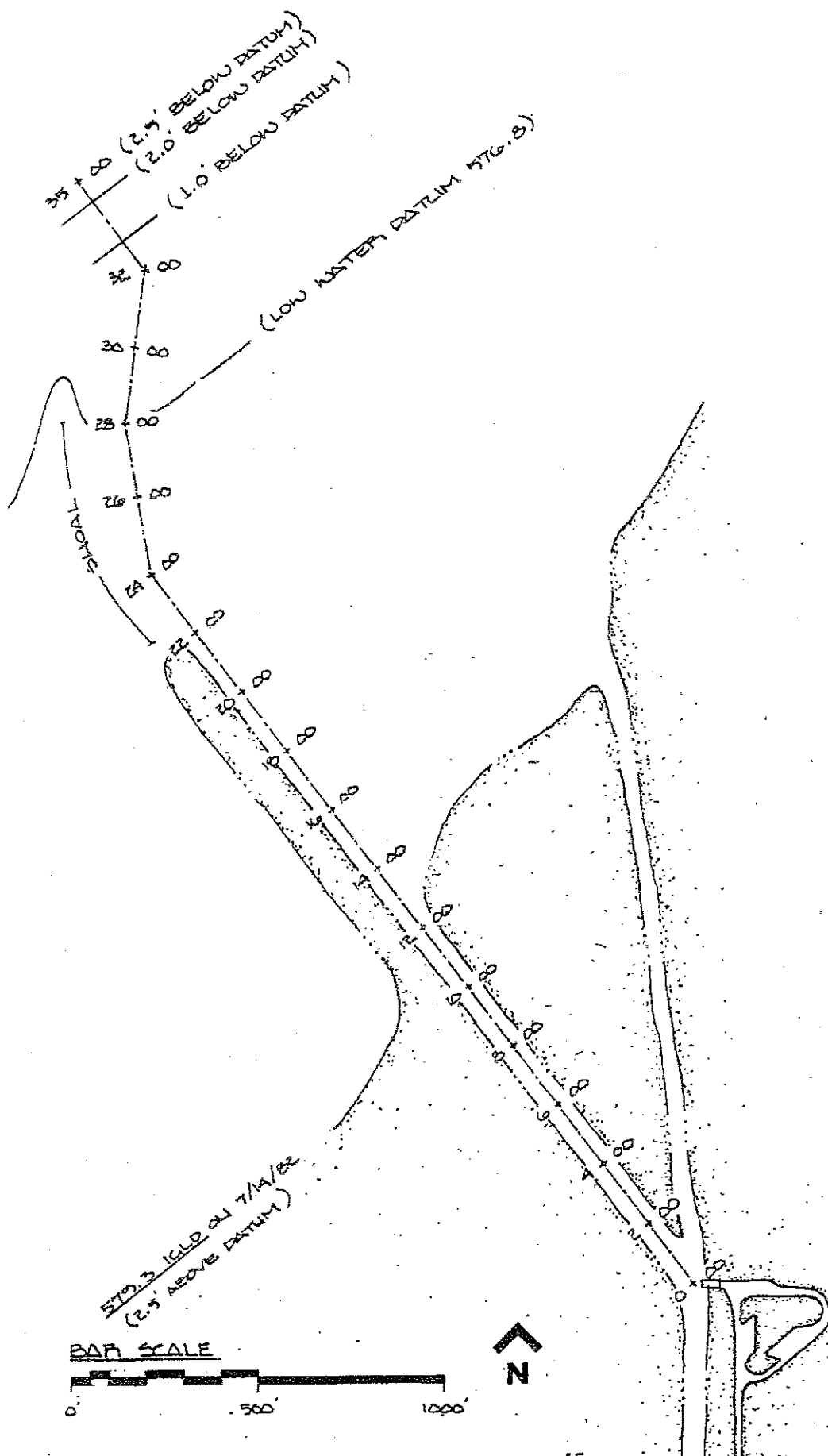
. CLEARING	900 SY @ 1 ⁰⁰ ...	900
. 22A GRAVEL	450 CY @ 12 ⁰⁰ ...	5,400
. CONCRETE CURB	75 EA @ 25 ⁰⁰ ...	1,875
. WOOD POSTS	50 EA @ 15 ⁰⁰ ...	750
. SKID-PIER	1 EA @ 3,000 ..	3,000
. 36x60 CONC. PLANK RAMP	LUMP SUM	10,000
. CHANNEL MARKERS	LUMP SUM	3,200
. MOBILIZATION	LUMP SUM	<u>1,500</u>
		26,625
	10% CONTINGENCY	<u>2,662</u>
	SUB-TOTAL	\$ 29,287

TOTAL PROJECT COST \$ 135,935

[NOTE... TO DREDGE CHANNEL TO 5.0 BELOW LOW WATER DATUM
ADD \$110,250 TO TOTAL PROJECT COST]

ALLEN CUT

③



This site is located in Tuscola County, four miles west and north of M-25 and seven miles west and north of Unionville.

In its present condition, this site provides a 24 foot by 44 foot concrete plank ramp with a skid pier, one vault type toilet and gravel parking for ten cars and twelve car-trailer units. The distance from the ramp to 2.5 feet below datum is 3,500 feet. For the first 1,900 feet, the bottom is a soft silt material that extends below the planned dredge depth. We do not feel the first 1,900 feet requires dredging at this time since this material is a soft, fluid silt which should not hinder boating through this area to any great extent.

Proposed improvements include lengthening the ramp to a toe elevation of three feet below datum, dredging a channel with a forty foot bottom width to three feet below datum and installing markers along the channel. All dredged material would be disposed of on site.

Both State and Federal permits must be obtained before proceeding with the dredging and construction of the launch ramp.

The Waterways Division construction crew would extend the ramp and install the channel markers. Dredging of the channel would be done on a contract basis. In either case, the work would probably be accomplished during one construction season.

The dredging project begins 1,900 feet from the ramp and extends lakeward another 1,600 feet. A successful project requires access to the dredging area across the privately owned spoils bank on the southwest side of the channel. The only alternative is construction of an access berm from the state land on the northeast side of the channel. This expensive alternative would not be economically feasible.

If the silt material in the first 1,900 feet of the channel needed to be removed at a later date, it could be done by hydraulic dredging methods. The dredged material could be placed on state owned lands near the site, above the ordinary high water mark (579.8 feet I.G.L.D.).

SOUNDINGS - ALLEN

WATER SURFACE EL. 579.3 IGLD ON 7/14/82

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
<u>0 + 00</u>	<u>3.5'</u>	<u>3' + SILT</u>	<u>@ 75' CHANNEL AT @ RAMP</u>
<u>2 + 00</u>	<u>3.5'</u>	<u>3' + "</u>	<u>" " "</u>
<u>4 + 00</u>	<u>3.2'</u>	<u>4' + "</u>	<u>" " "</u>
<u>6 + 00</u>	<u>3.0'</u>	<u>6' + "</u>	<u>" " "</u>
<u>8 + 00</u>	<u>3.3'</u>	<u>5' + "</u>	<u>" " "</u>
<u>10 + 00</u>	<u>3.2'</u>	<u>5' + "</u>	<u>" " "</u>
<u>12 + 00</u>	<u>3.0'</u>	<u>5' + "</u>	<u>" " "</u>
<u>14 + 00</u>	<u>2.8'</u>	<u>5' + "</u>	<u>" " "</u>
<u>16 + 00</u>	<u>2.5'</u>	<u>5' + "</u>	<u>" " "</u>
<u>18 + 00</u>	<u>2.0'</u>	<u>5' + "</u>	<u>" " " - END NORTH LAND</u>
<u>20 + 00</u>	<u>2.5'</u>	<u>2.5' "</u>	<u>" " "</u>
<u>22 + 00</u>	<u>2.0'</u>	<u>1.5' "</u>	<u>" " " - END SOUTH SPIT</u>
<u>24 + 00</u>	<u>2.0'</u>	<u>FIRM SAND</u>	<u>OPEN WATER - TURN 30° ± TO NORTH</u>
<u>26 + 00</u>	<u>2.2'</u>	<u>" "</u>	<u>" "</u>
<u>28 + 00</u>	<u>2.5'</u>	<u>" "</u>	<u>" " - TURN 15° ± TO NORTH</u>
<u>30 + 00</u>	<u>3.0'</u>	<u>FIRM SAND/GRAVEL</u>	<u>" "</u>
<u>32 + 00</u>	<u>2.8'</u>	<u>" "</u>	<u>" " - TURN WEST</u>
<u>35 + 00</u>	<u>5.0'</u>	<u>" "</u>	<u>" "</u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>

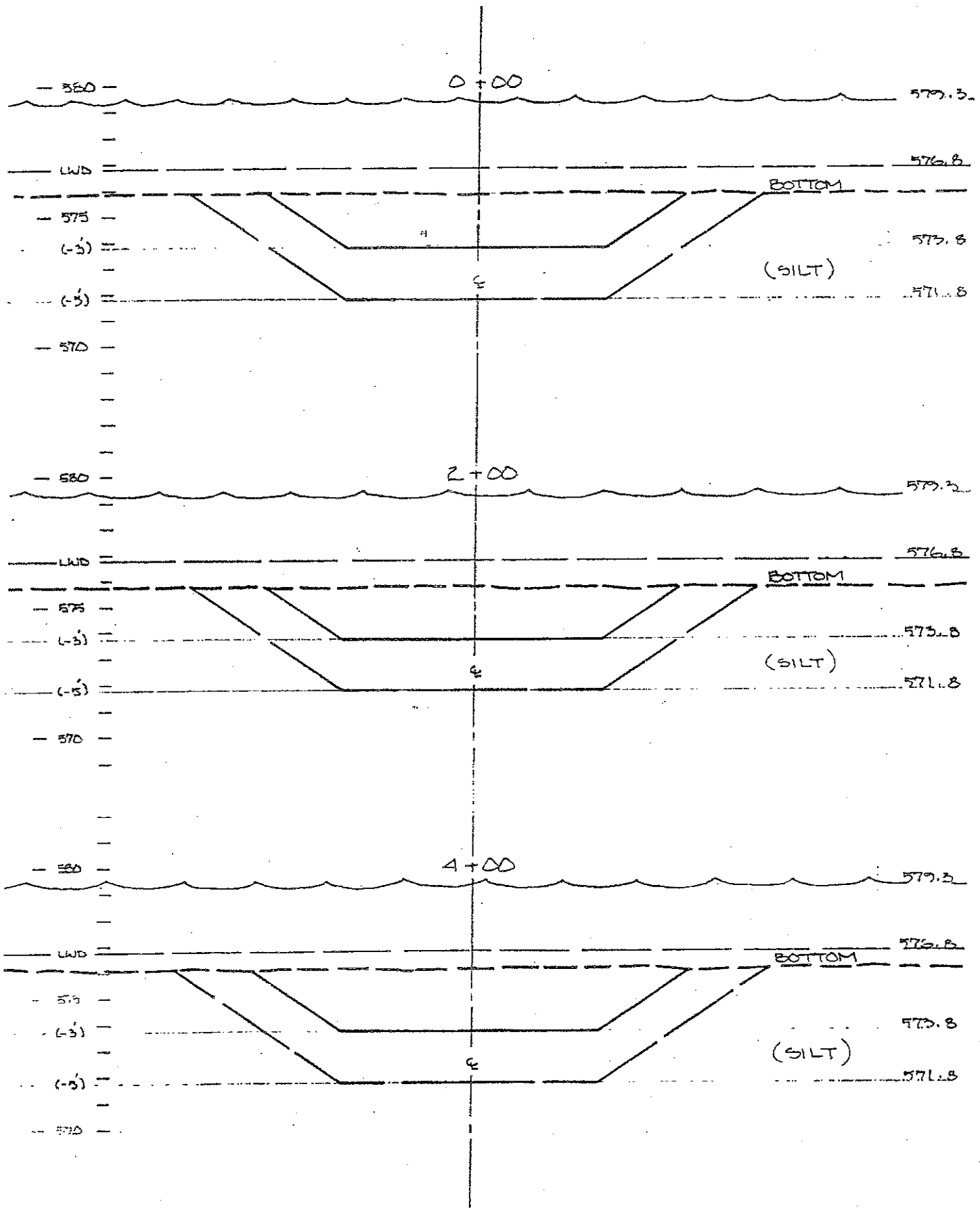
PROBINGS - ALLEN

WATER SURFACE EL. 579.1 ICID ON 8/11/82

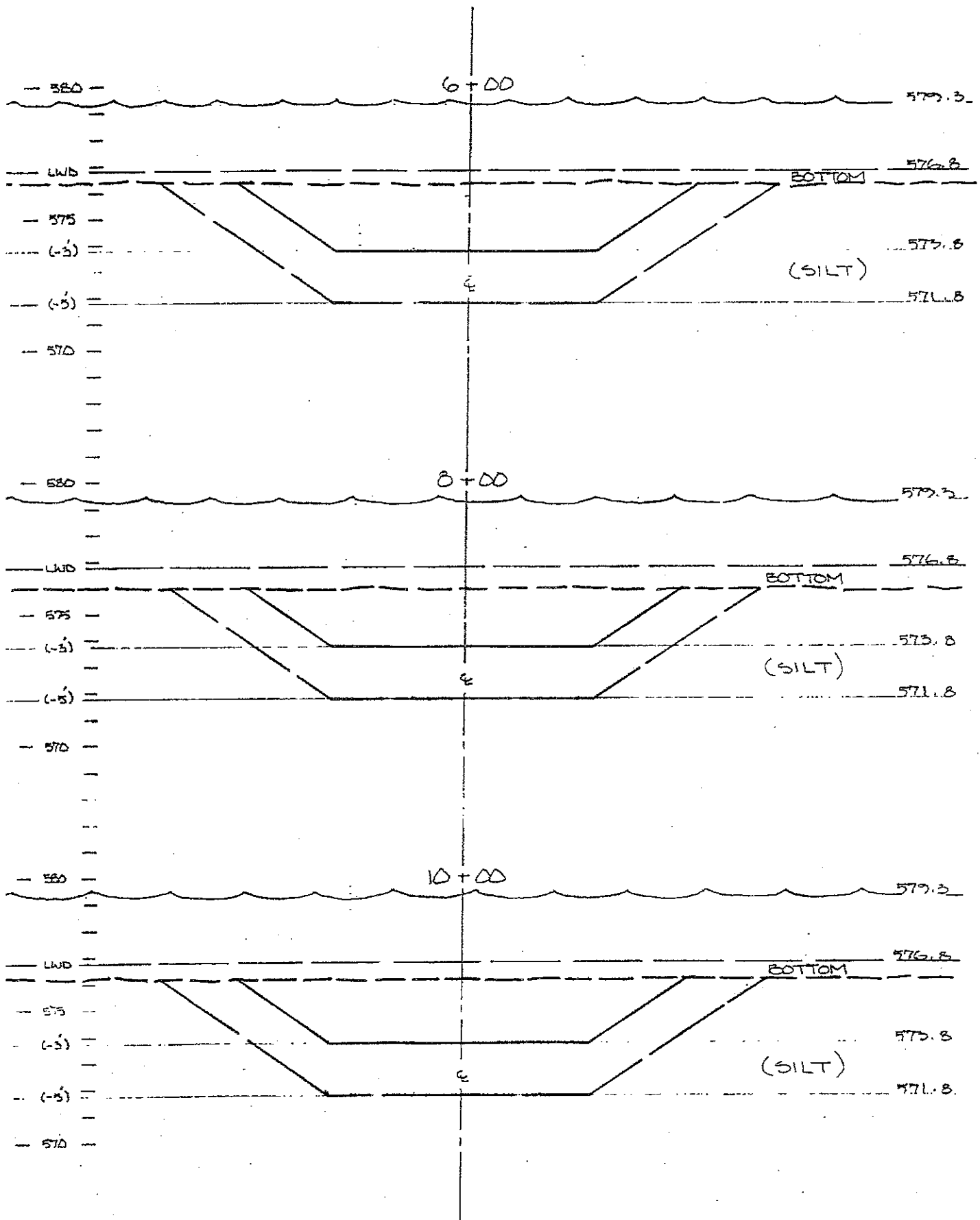
NOTE - BOTTOM CONDITIONS DETERMINED USING PEAT ROD

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
22 + 00	0.0' - 3.0'	WATER	
	3.0' - 8.0'	SAND	END OF PROBING
26 + 00	0.0' - 3.0'	WATER	
	3.0' - 4.0'	SAND	
	4.0' +	CLAY	REFUSAL AT 4.0'
28 + 00	0.0' - 2.5'	WATER	
	2.5' - 5.0'	SAND	
	5.0' +	CLAY	REFUSAL AT 5.0'
30 + 00	0.0' - 2.5'	WATER	
	2.5' - 5.5'	SAND	
	5.5' +	CLAY	REFUSAL AT 5.5'

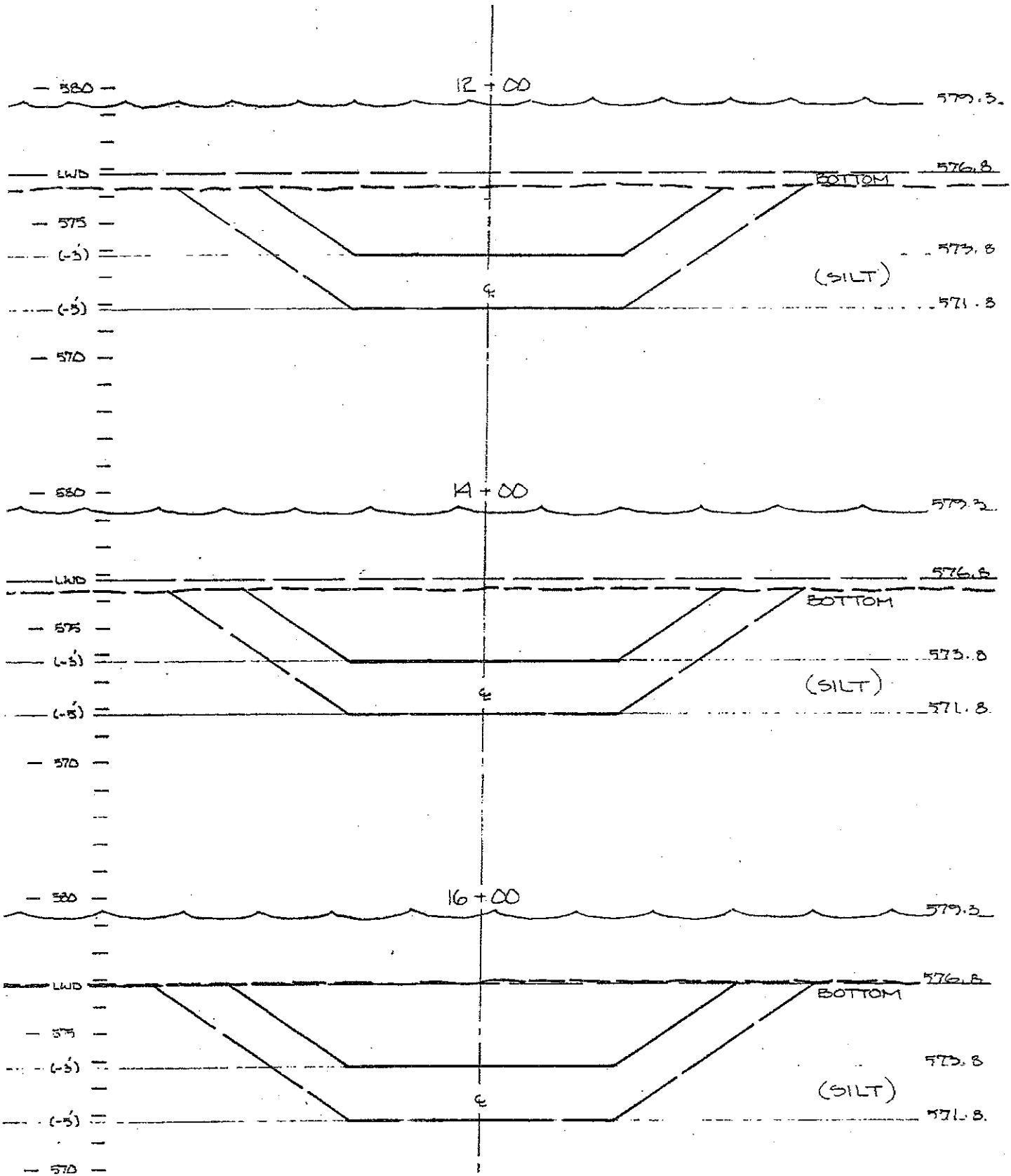
ALLEN CUT



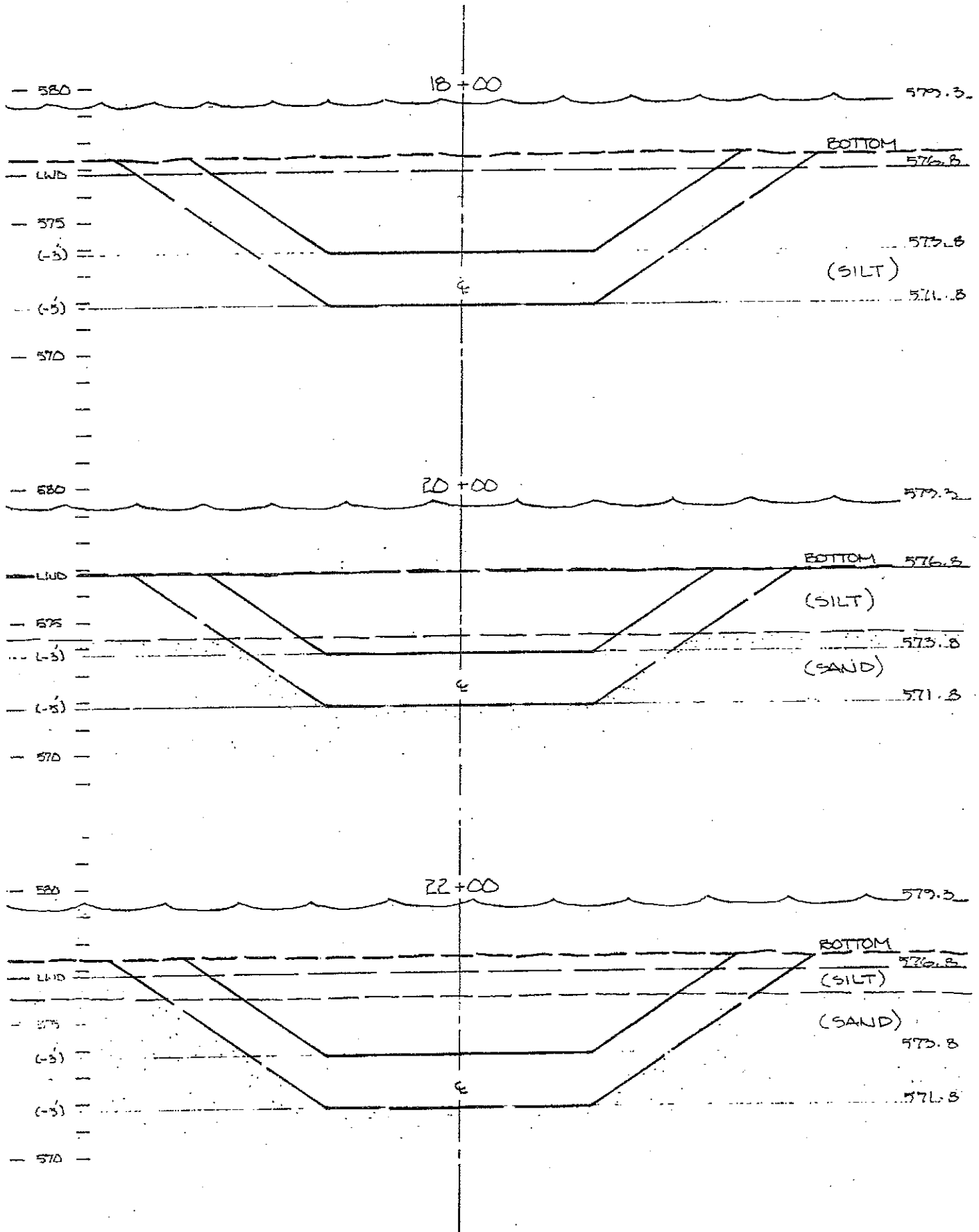
ALLEN CUT



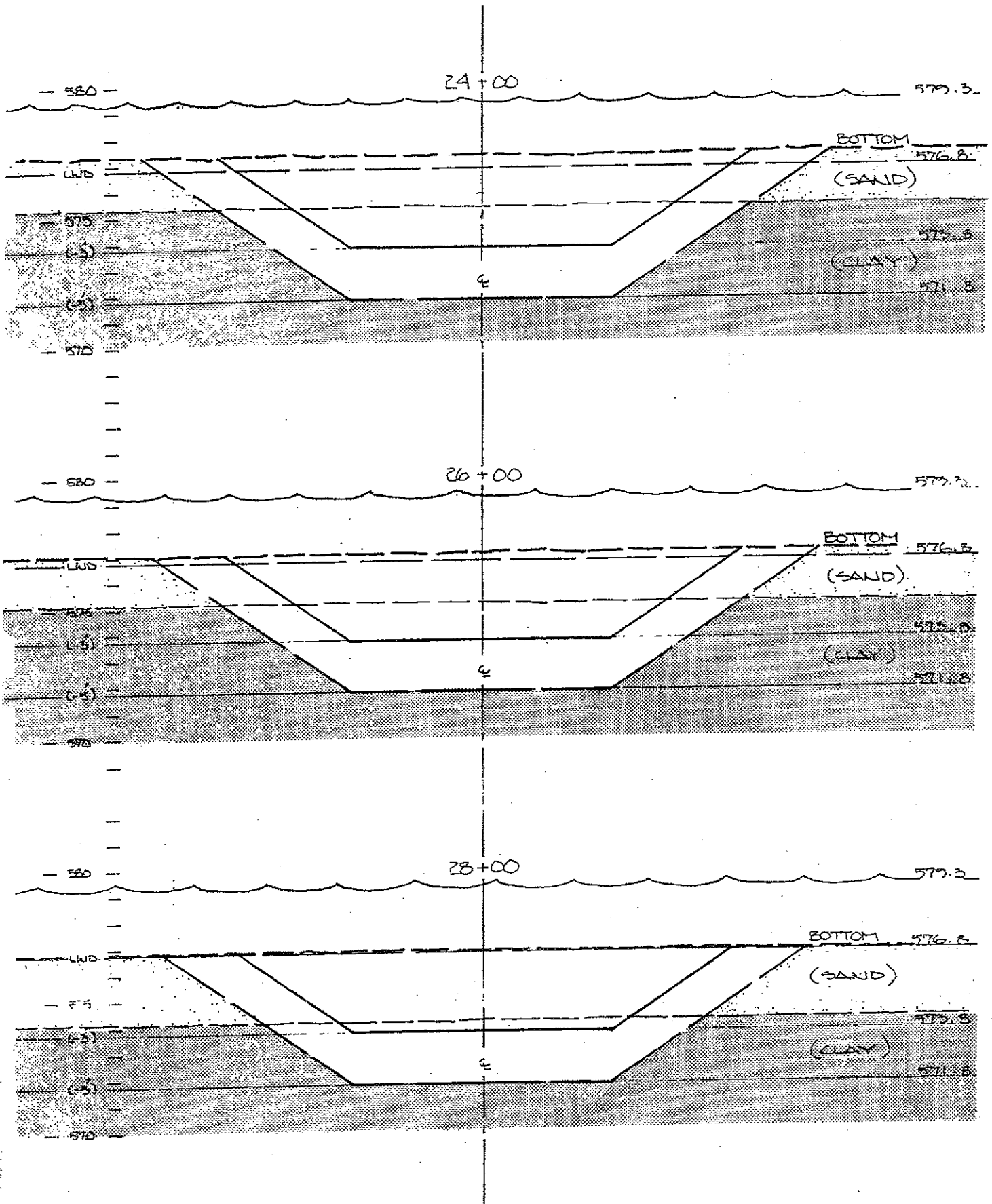
ALLEN CUT



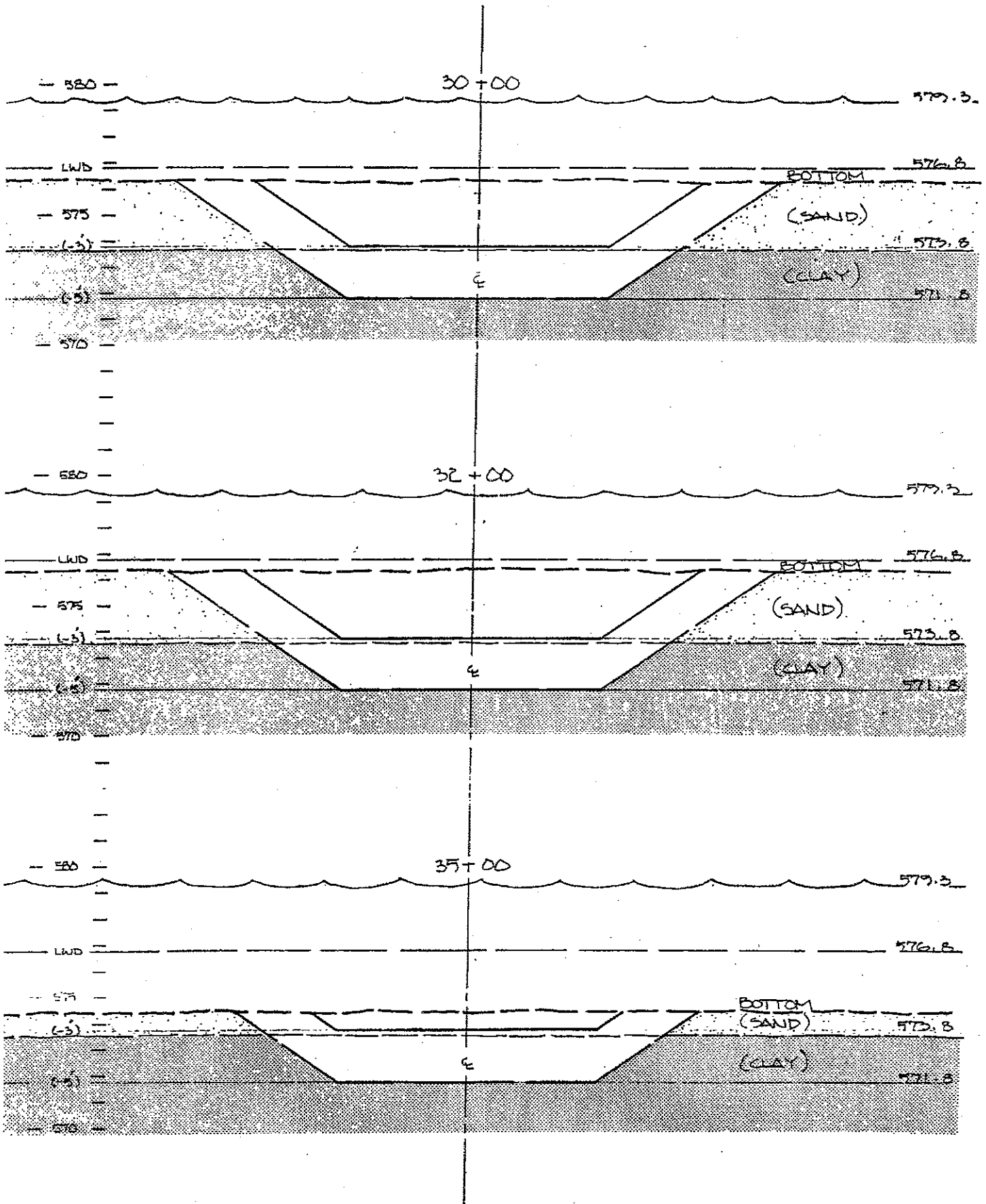
ALLEN CUT



ALLEN CUT



ALLEN CUT



- (40' WIDE TOE OF CHANNEL 3.0' BELOW LWD)

[illegible]

<u>5,750 CY</u>	SAND
<u>1,150 CY</u>	CLAY

EARTHWORK - ALLEN

(40' WIDE TOE OF CHANNEL 5.0' BELOW LWD)

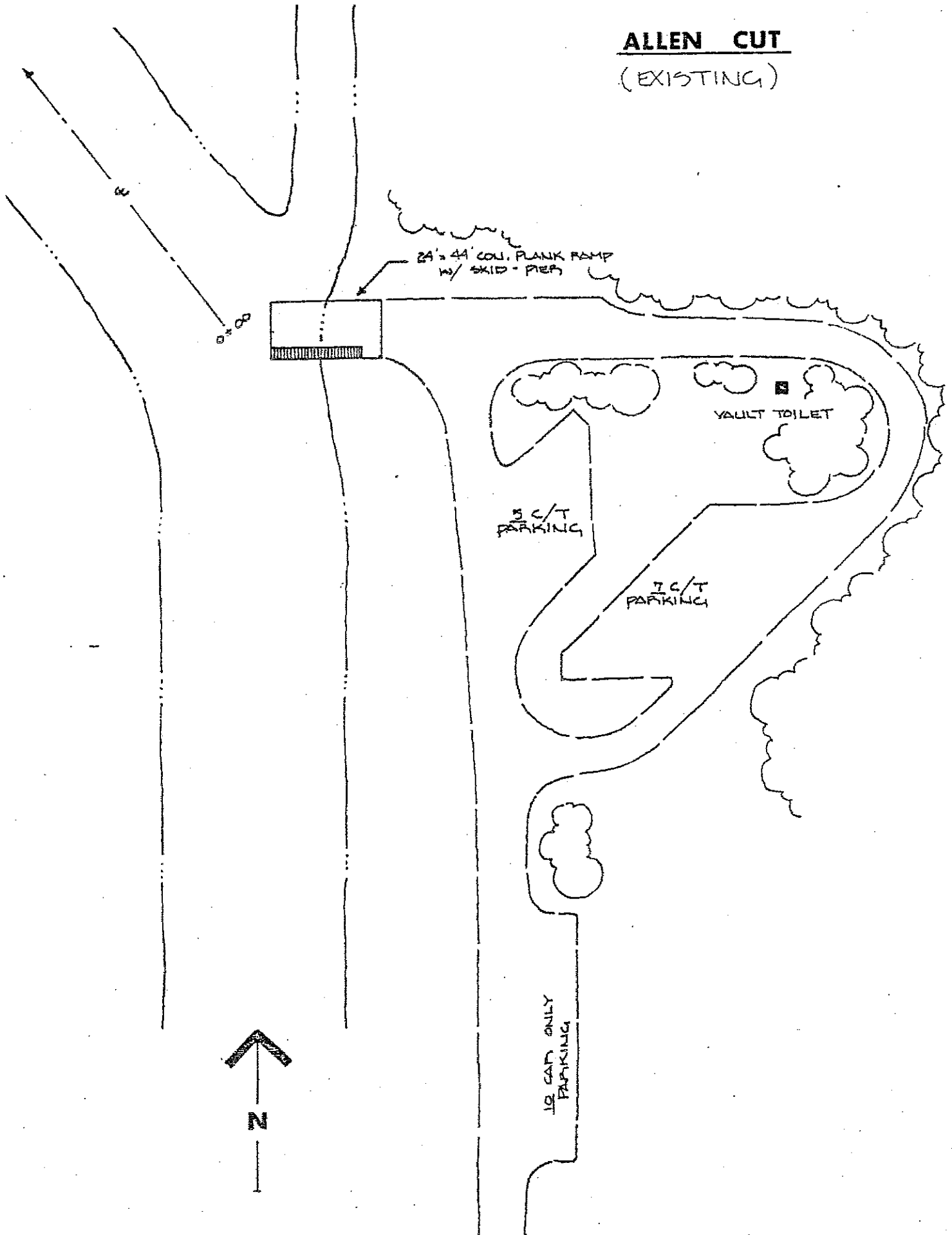
AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

[illegible]

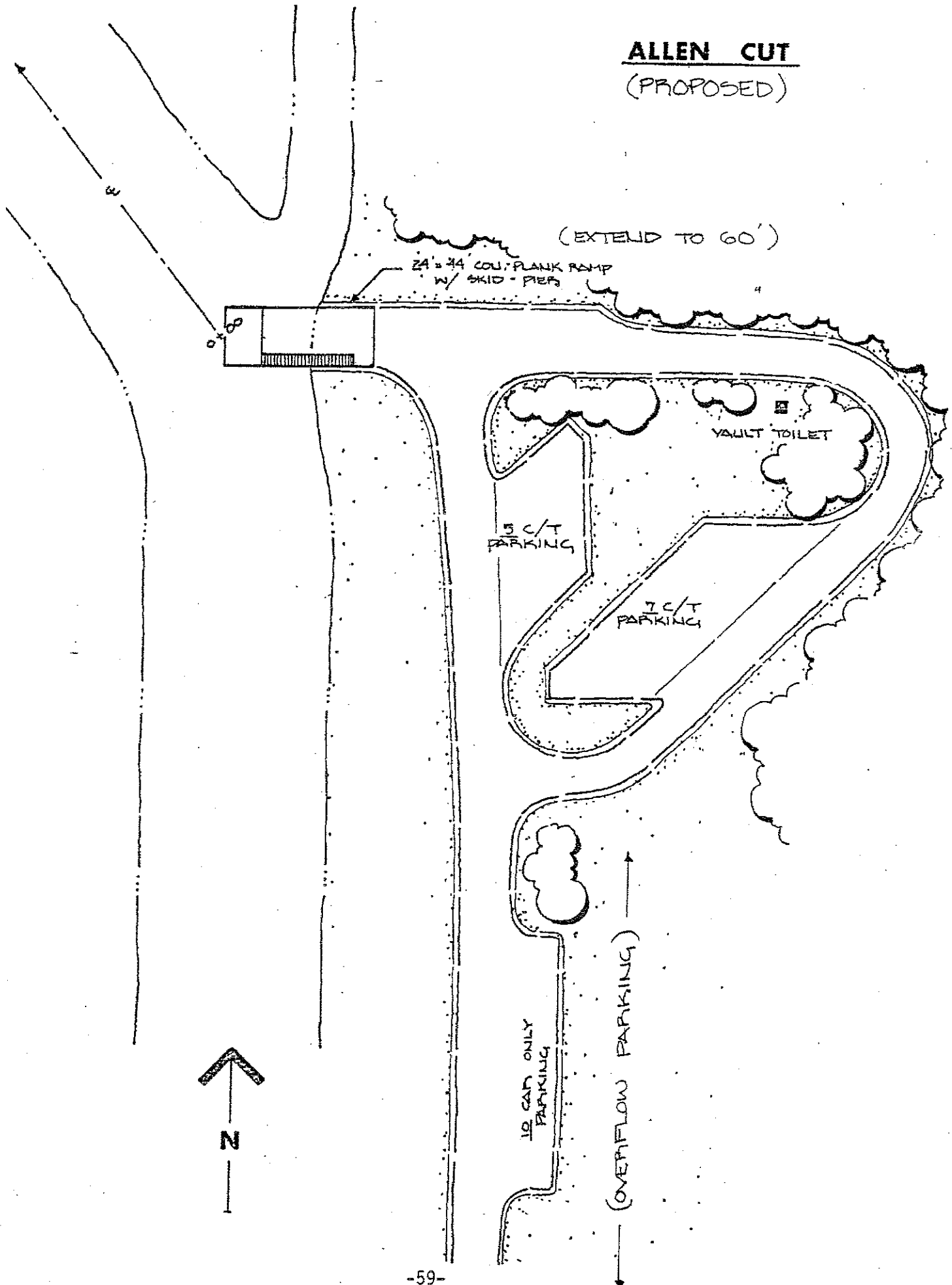
TOTAL DREDGING TO 5.0' BELOW LWD 14,300 CU. YD.

<u>8,750 CY</u>	SAND
<u>5,350 CY</u>	CLAY

ALLEN CUT
(EXISTING)



ALLEN CUT
(PROPOSED)



QUANTITY / COST ESTIMATE

ALLEN CUT

WORK BY CONTRACT - CHANNEL

DREDGE, WASTE ON SITE	7,100 CY @ .50	35,500
	10% CONTINGENCY	<u>3,550</u>
	SUB-TOTAL	\$ 39,050

WORK BY STATE - EXTEND RAMP

EXTEND 24'x44' RAMP TO 24'x60'	LUMP SUM	2,000
GRADE OFF WASTE	7,100 CY @ .50	3,550
CHANNEL MARKERS	LUMP SUM	1,200
MOBILIZATION	LUMP SUM	<u>1,500</u>
		8,250
	10% CONTINGENCY	<u>825</u>
	SUB-TOTAL	\$ 9,075

TOTAL PROJECT COST \$ 48,125

[NOTE ... TO DREDGE CHANNEL TO 5.0' BELOW LOW WATER DATUM ADD \$39,600 TO TOTAL PROJECT COST]

④



This site is located in Huron County, off Geiger Road, 2.5 miles west of M-25 and 5 miles north of Sebewaing.

Existing site developments include a 24 foot by 40 foot concrete plank ramp with a skid pier, 2 vault type toilets and parking for 20 cars and 12 car and trailer units. The distance from the ramp to 3 feet below datum is 1,500 feet. The present channel is shallow and approximately 15 feet wide.

Proposed improvements include widening the ramp to 36 feet, lengthening the ramp to a toe elevation of 3 feet below datum, installing channel markers and constructing parking for 40 cars and 30 car and trailer units. Material dredged from the channel will be used as fill to make room for the parking expansion. Existing rip rap along west shore will be dozed toward the lake to form a ridge in back of which the dredged material will be placed.

Funds are presently available for dredging at this location. On a contract basis, this dredging would be accomplished in 1983. Waterways Division has valid State and Federal permits for the dredging and ramp construction, although minor modification must be requested to bring the permits into conformance with the final plans. This should not delay the estimated completion date.

Construction of the ramp and parking areas and installation of the channel markers would be accomplished by the Waterways Division construction crew. This work could be completed during one construction season following approval of required funds.

No major problems are predicted in the construction of this project.

The dredging of the channel will provide improved bank fishing opportunities. The suggestion has also been made that additional dredging be done along the east side of the island to provide additional areas for bank fishing. The area to be dredged would be in accordance with recommendations from Fisheries Division for this type of work. Quantities for this work would be developed using the recommendations for dredging from Fisheries Division.

SOUNDINGS - SUMAC

WATER SURFACE EL. 578.7 ICID ON 11/15/81

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
<u>0 + 00</u>	<u>3.3'</u>	<u>FIRM</u>	<u>℄ CHANNEL AT ℄ RAMP</u>
<u>1 + 20</u>	<u>2.7'</u>	<u>"</u>	<u>OPEN WATER</u>
<u>2 + 35</u>	<u>2.7'</u>	<u>"</u>	<u>" "</u>
<u>3 + 00</u>	<u>3.1'</u>	<u>"</u>	<u>" "</u>
<u>4 + 85</u>	<u>3.3'</u>	<u>"</u>	<u>" "</u>
<u>6 + 50</u>	<u>3.8'</u>	<u>"</u>	<u>" "</u>
<u>10 + 85</u>	<u>4.7'</u>	<u>"</u>	<u>" "</u>
<u>15 + 55</u>	<u>5.1'</u>	<u>"</u>	<u>" "</u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>
<u>+ </u>	<u> </u>	<u> </u>	<u> </u>

PROBINGS - SUMAC

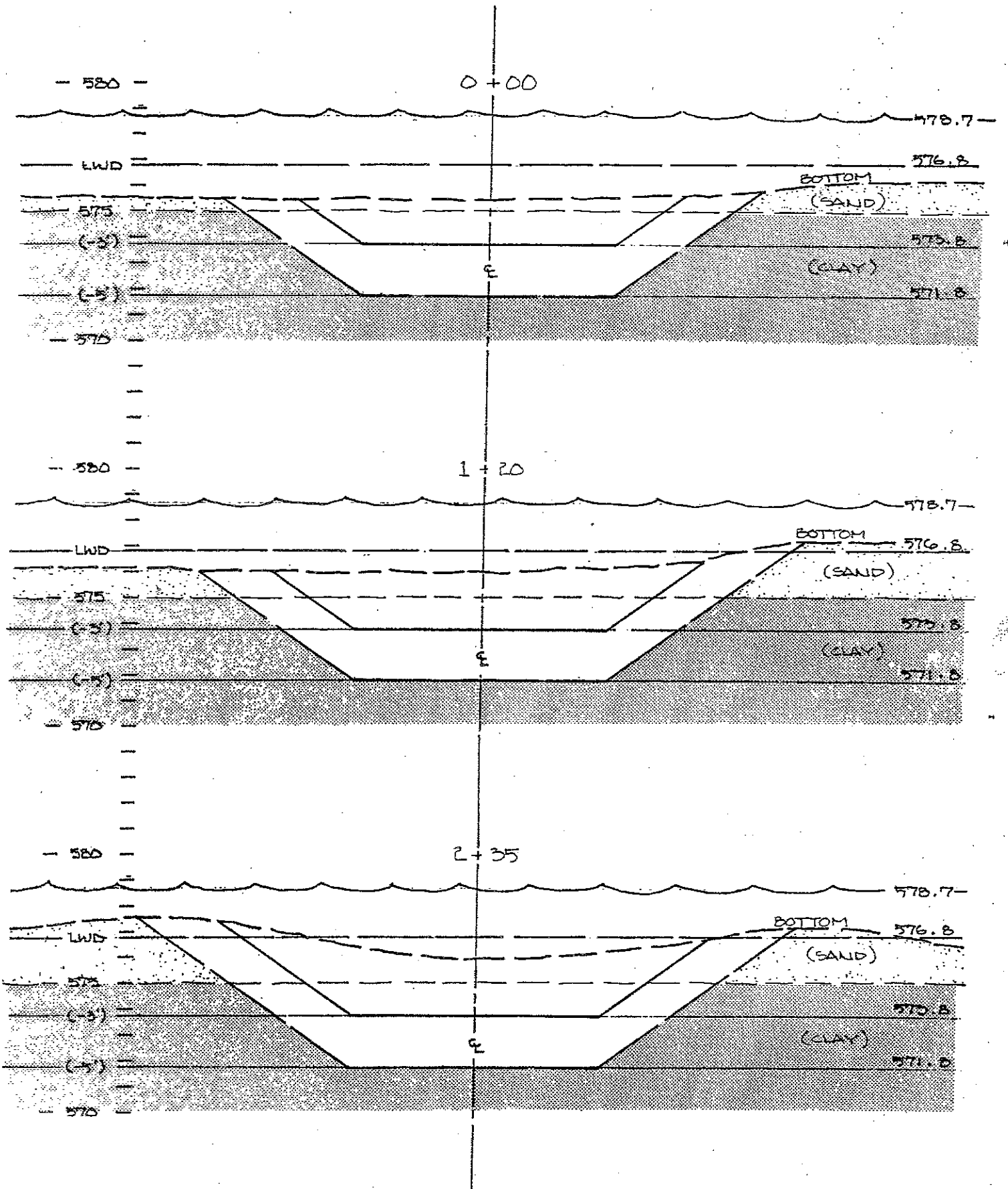
WATER SURFACE EL. 579.1 IGLD ON 8/11/82

NOTE - BOTTOM CONDITIONS DETERMINED USING FEAT ROD

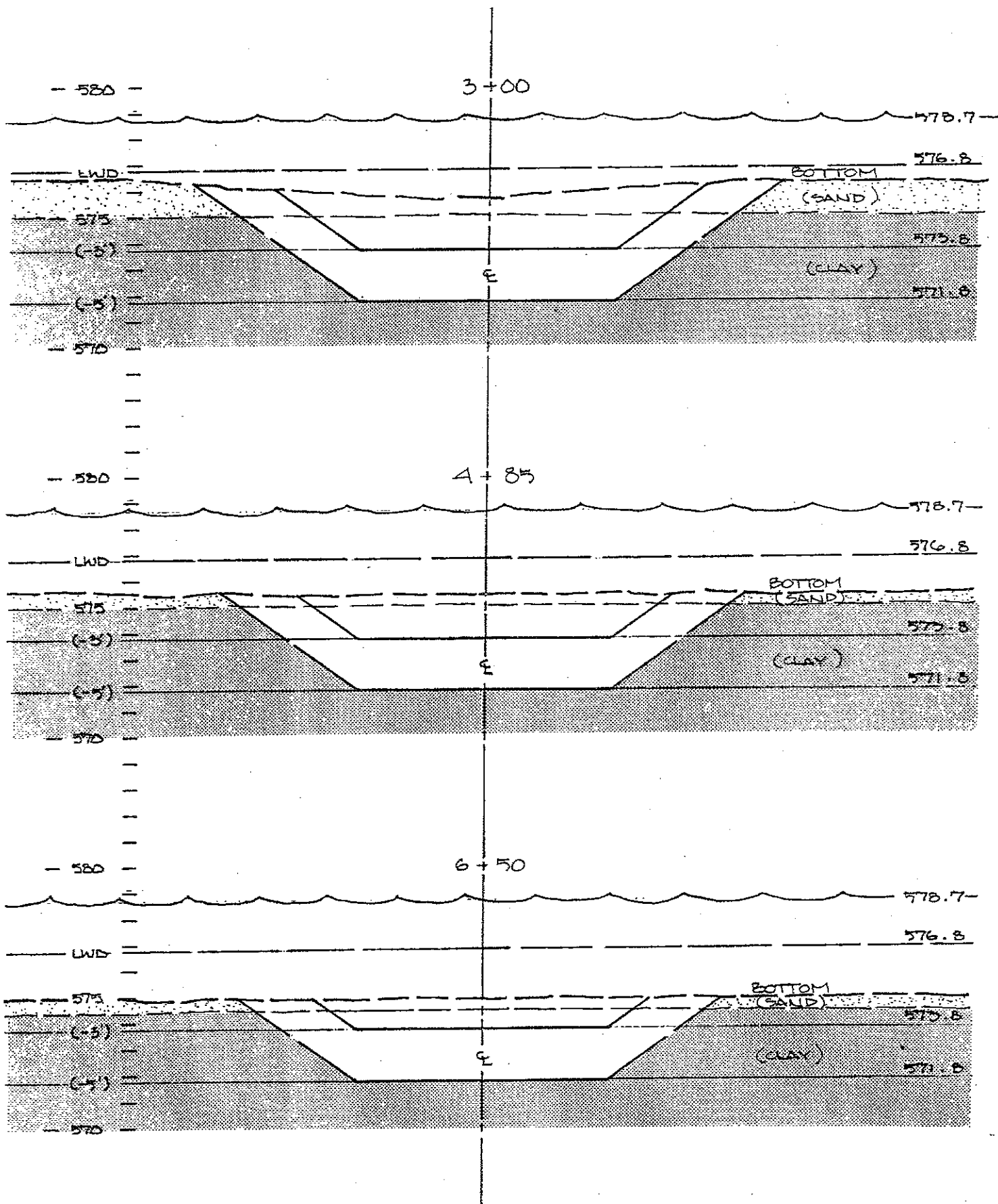
<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
0 + 00	0.0' - 2.8'	WATER	
+	2.8' - 3.3'	SILT	
+	3.3' - 6.2'	SAND	
+	6.2' +	CLAY,	REFUSAL AT 6.2'
+			
3 + 00	0.0' - 3.0'	WATER	
+	3.0' - 5.9'	SAND	
+	5.9' +	CLAY,	REFUSAL AT 5.9'
+			
5 + 00	0.0' - 3.8'	WATER	
+	3.8' - 5.2'	SAND	
+	5.2' +	CLAY,	REFUSAL AT 5.2'
+			
6 + 00	0.0' - 4.0'	WATER	
+	4.0' - 5.5'	SAND	
+	5.5' +	CLAY,	REFUSAL AT 5.5'
+			
+			
+			
+			
+			

NOTE - THE 'NATURAL' CLAY LEVEL OUTSIDE OF THE EXISTING CHANNEL IS FOUND AT 574.9 IGLD

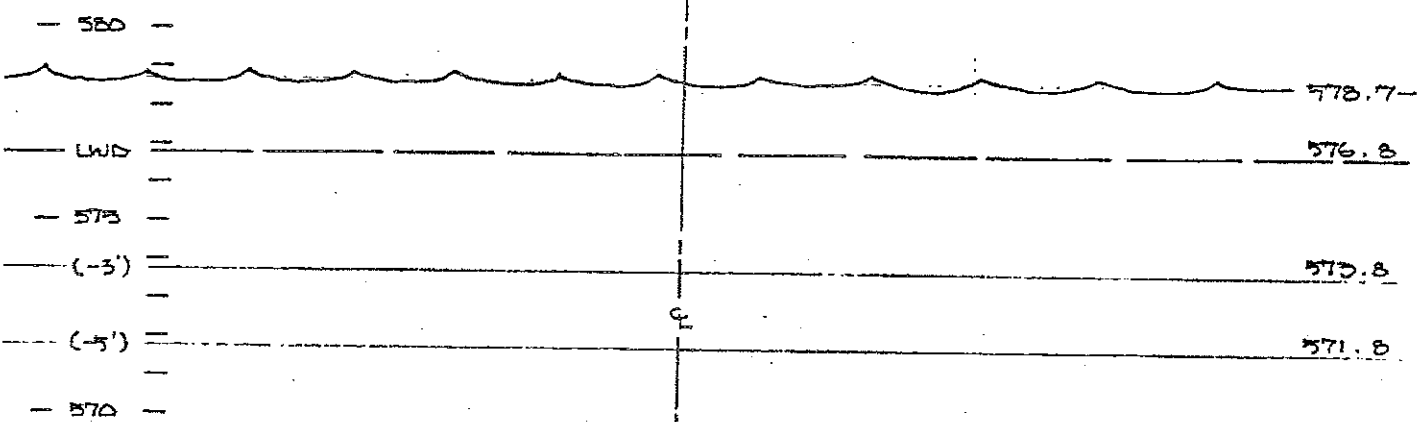
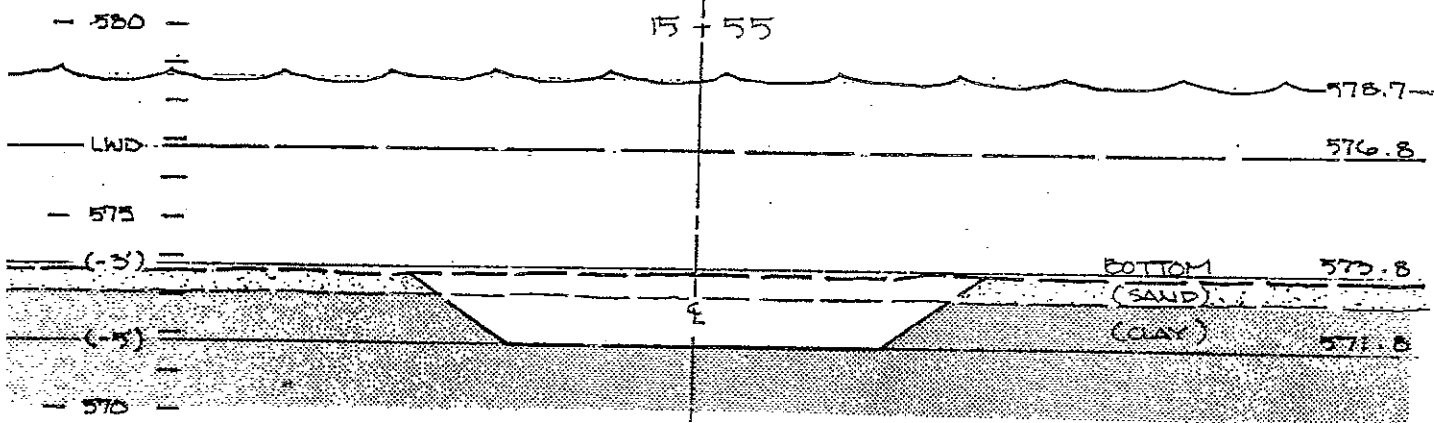
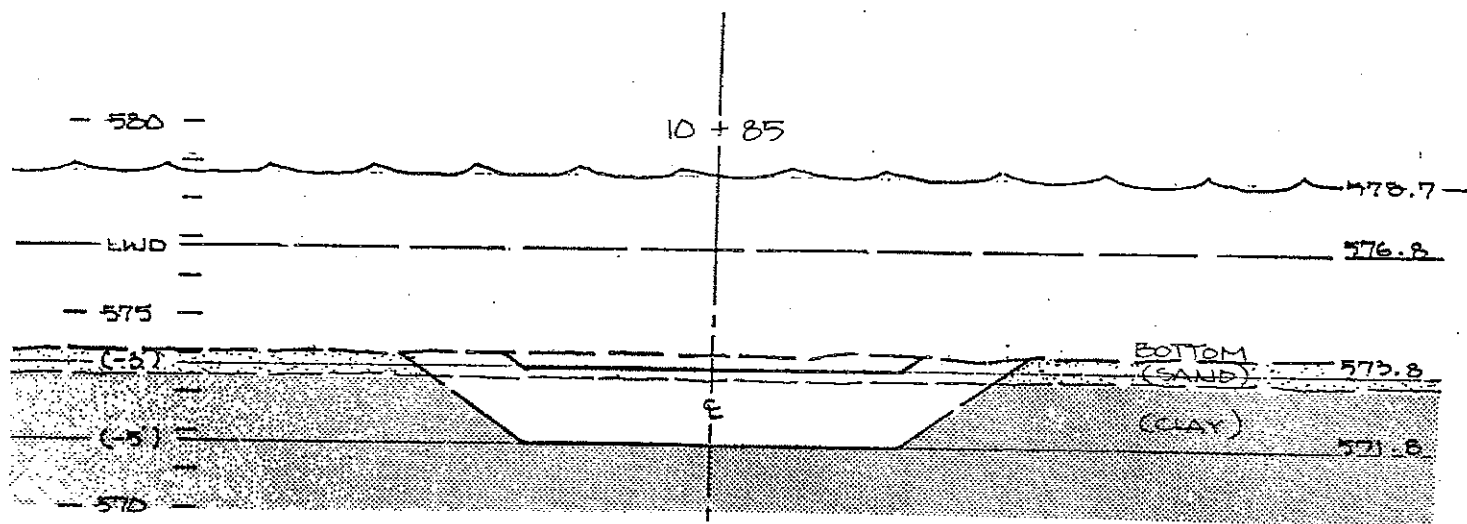
SUMAC ISLAND



SUMAC ISLAND



SUMAC ISLAND



EARTHWORK - SLIMAC

(40' WIDE TOE OF CHANNEL 3.0' BELOW LWD)

AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

STATION	AREA	STATION	AREA	DISTANCE	VOLUME (CU. YD.)
0 + 00	82	1 + 20	108	120	424
1 + 20	108	2 + 35	129	115	506
2 + 35	129	3 + 00	112	65	291
3 + 00	112	4 + 85	82	185	670
4 + 85	82	6 + 50	52	165	414
6 + 50	52	10 + 85	16	435	560
10 + 85	16	15 + 55	0	470	146
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			
+ +		+ +			

TOTAL DREDGING TO 3.0' BELOW LWD 3,050 CU. YD.

[1,500 CY SAND
1,550 CY CLAY]

EARTHWORK - SUMAC

(40' WIDE TOE OF CHANNEL 5.0' BELOW LWD)

AVERAGE END METHOD : $\frac{[A_1 + A_2]}{2} \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

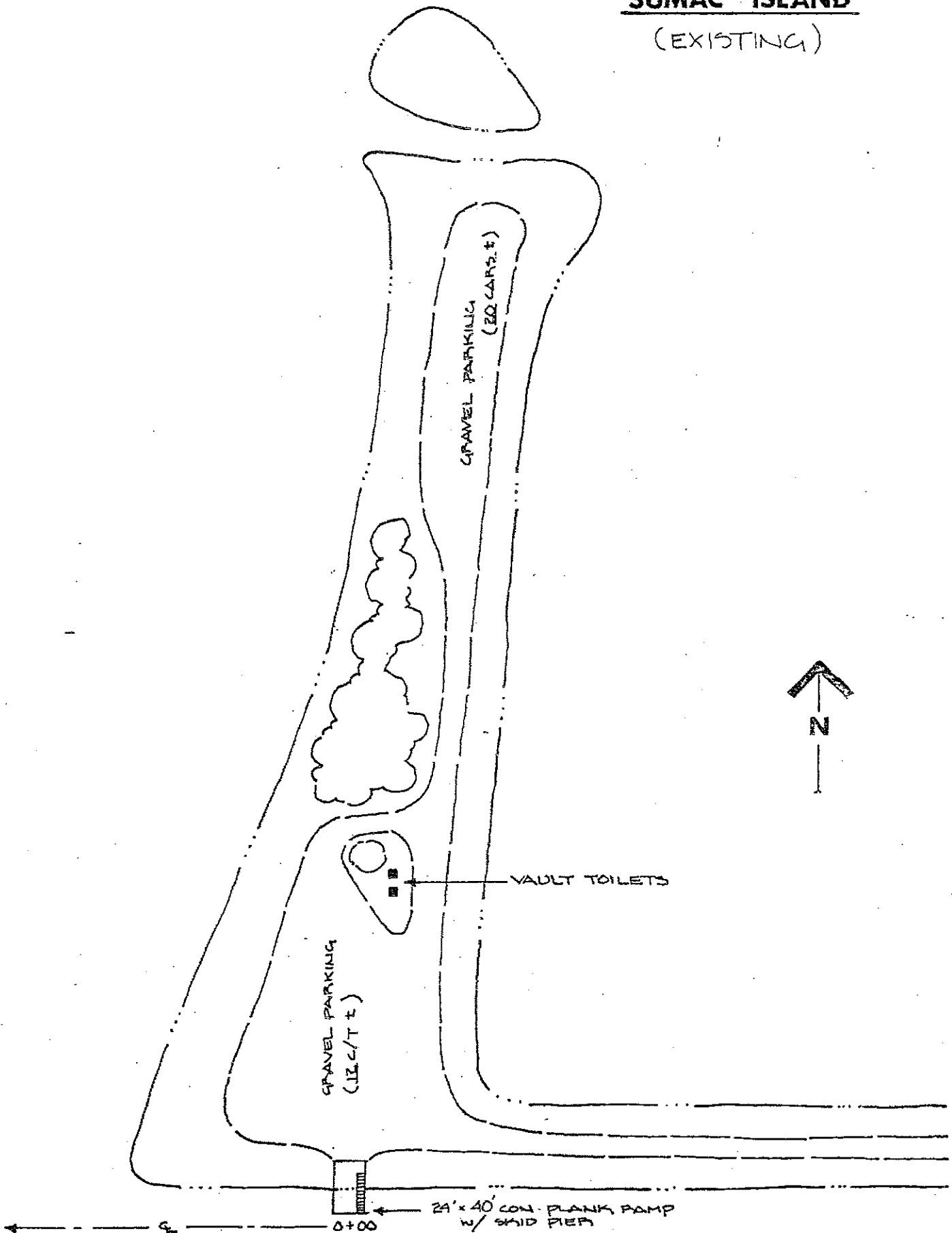
STATION	AREA	STATION	AREA	DISTANCE	VOLUME (CU. YD.)
0 + 00	197	1 + 20	227	120	945
1 + 20	227	2 + 35	253	115	1025
2 + 35	253	3 + 00	233	65	586
3 + 00	233	4 + 85	197	185	1475
4 + 85	197	6 + 50	165	165	1107
6 + 50	165	10 + 85	112	435	2237
10 + 85	112	15 + 55	82	470	1702
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—

TOTAL DREDGING TO 5.0' BELOW LWD 9,100 CU. YD.

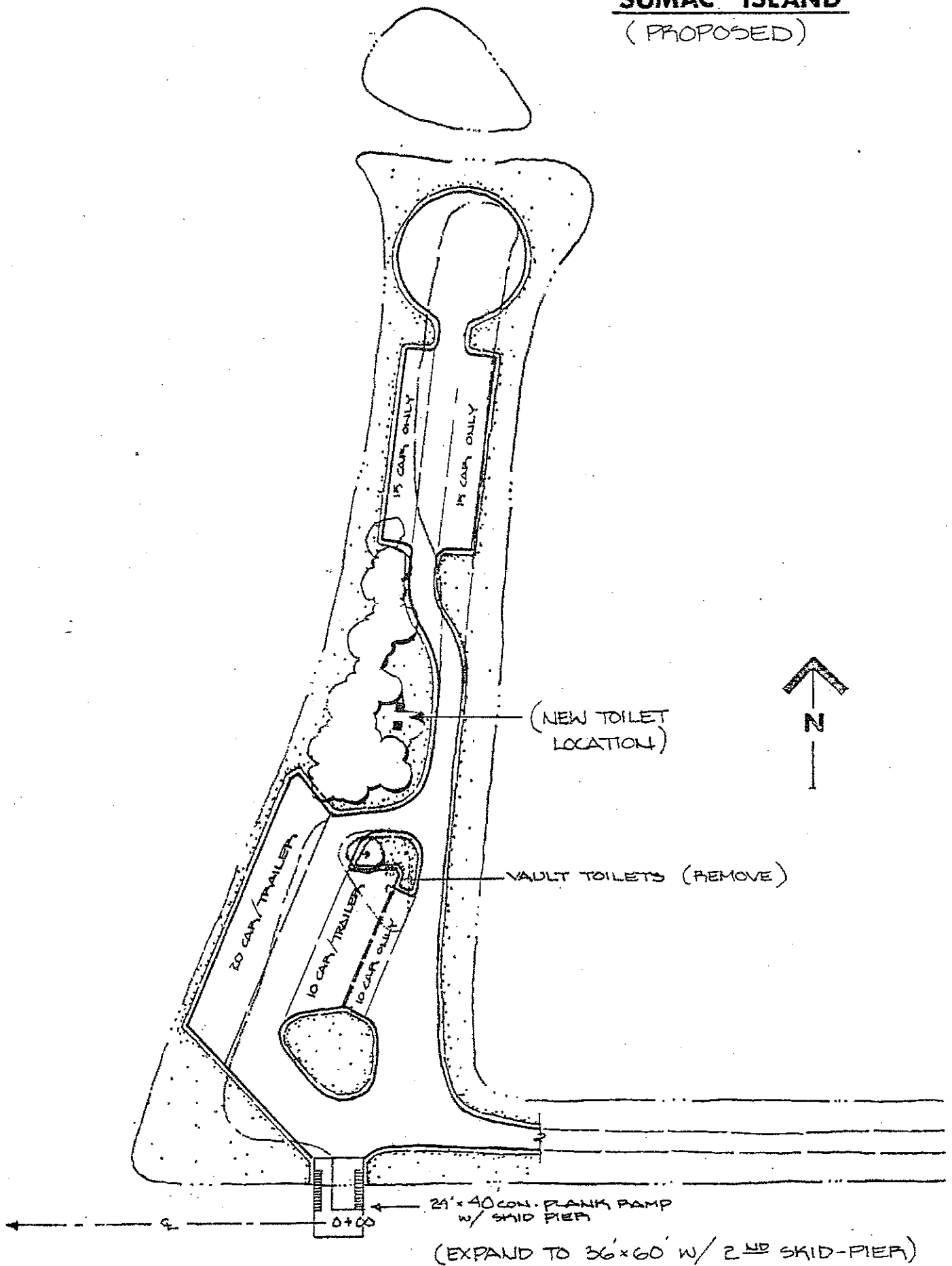
[2,350 CY SAND
6,750 CY CLAY]

SUMAC ISLAND

(EXISTING)



SUMAC ISLAND
(PROPOSED)



QUANTITY / COST ESTIMATE

SUMAC ISLAND

WORK BY CONTRACT - CHANNEL

• DREDGE, WASTE ON SITE	3,050 CY @ 5 ⁰⁰ ...	\$15,250
	10% CONTINGENCY...	<u>1,525</u>
	SUB-TOTAL	\$ 16,775

WORK BY STATE - PARKING AND RAMP

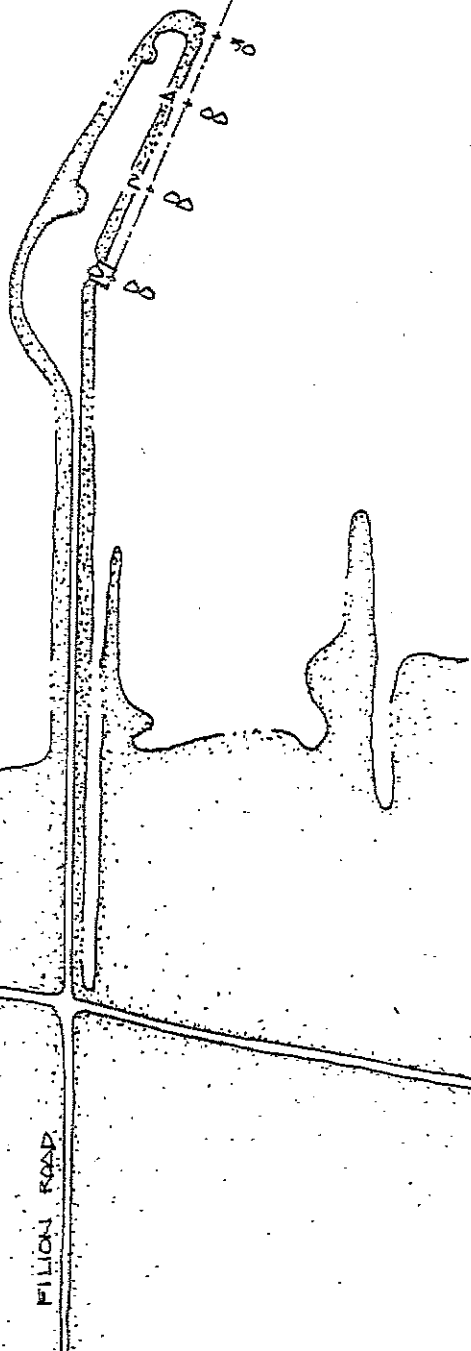
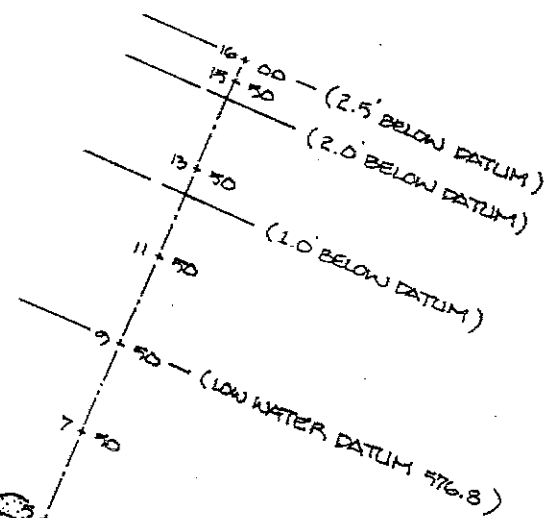
• CLEARING	150 SY @ 1 ⁰⁰ ...	150
• SAND FILL (FROM DREDGE)	1,500 CY @ .50 ...	750
• 22A GRAVEL	350 CY @ 12 ⁰⁰ ...	4,200
• GRADE OFF WASTE	1,550 CY @ .50 ...	775
• CONCRETE CURB	95 EA @ 25 ⁰⁰ ...	2,375
• WOOD POSTS	100 EA @ 15 ⁰⁰ ...	1,500
• EXPAND 24x40 RAMP TO 36x60	LUMP SUM	4,000
• SKID-PIER	1 EA @ 3000 ..	3,000
• CHANNEL MARKERS	LUMP SUM	800
• VAULT TOILETS	2 EA @ 1500 ..	3,000
• MOBILIZATION	LUMP SUM	<u>1,500</u>
		22,050
	10% CONTINGENCY	<u>2,205</u>
	SUB-TOTAL	\$ 24,255

TOTAL PROJECT COST \$ 41,030

[NOTE... TO DREDGE CHANNEL TO 5.0' BELOW LOW WATER DATUM
ADD \$42,350 TO TOTAL PROJECT COST]

FILION ROAD
(MUD CREEK)

5



579.3 KGLD ON 7/14/82
(2.5' ABOVE DATUM)

BAR SCALE



This site is located in Huron County, 0.5 miles west of M-25 and 14 miles north of Sebawaing.

The existing site consists of a 36 foot by 50 foot concrete plank ramp with a skid pier, 2 vault type toilets and gravelled parking for 50 to 70 cars and 18 car and trailer units. The distance from the ramp to 2.5 feet below datum is 1,600 feet.

Proposed improvements include lengthening the ramp to a toe elevation 3 feet below datum, dredging of a channel with a 40 foot bottom width and installing markers on the channel. The channel should extend a minimum of 1,600 feet from the ramp. All dredged material will be disposed of offsite on an upland area, not in a wetland.

Both State and Federal permits must be obtained before ramp construction or channel dredging can begin.

The Waterways Division construction crew would extend the ramp and install the channel markers. Channel dredging could be accomplished on a contract basis. Construction could be completed in one construction season.

No major problems are anticipated in the construction of this project.

The dredging of the channel will provide improved bank fishing opportunities along the north side of the site. Additional areas for dredging for this purpose will be considered upstream of the ramp area and on the south side of the site in accordance with recommendations from Fisheries Division.

SOUNDINGS - FILION

WATER SURFACE EL. 579.3 IGLD ON 7/14/82

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
<u>0 + 00</u>	<u>3.0'</u>	<u>3.0' SILT</u>	<u>& 30' CHANNEL AT & RAMP</u>
<u>2 + 00</u>	<u>2.8'</u>	<u>2.8' "</u>	<u>& 40' "</u>
<u>4 + 00</u>	<u>2.2'</u>	<u>2.2' SILT w/ SAND</u>	<u>NO CHANNEL</u>
<u>5 + 50</u>	<u>2.0'</u>	<u>0.7' " "</u>	<u>" " - END SITE TO SOUTH</u>
<u>7 + 50</u>	<u>2.0'</u>	<u>FIRM SAND</u>	<u>OPEN WATER</u>
<u>9 + 50</u>	<u>2.5'</u>	<u>" "</u>	<u>" "</u>
<u>11 + 50</u>	<u>3.0'</u>	<u>" "</u>	<u>" "</u>
<u>13 + 50</u>	<u>3.7'</u>	<u>" "</u>	<u>" "</u>
<u>15 + 50</u>	<u>4.7'</u>	<u>" "</u>	<u>" "</u>
<u>16 + 00</u>	<u>3.0'</u>	<u>" "</u>	<u>" "</u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>
<u> + </u>	<u> </u>	<u> </u>	<u> </u>

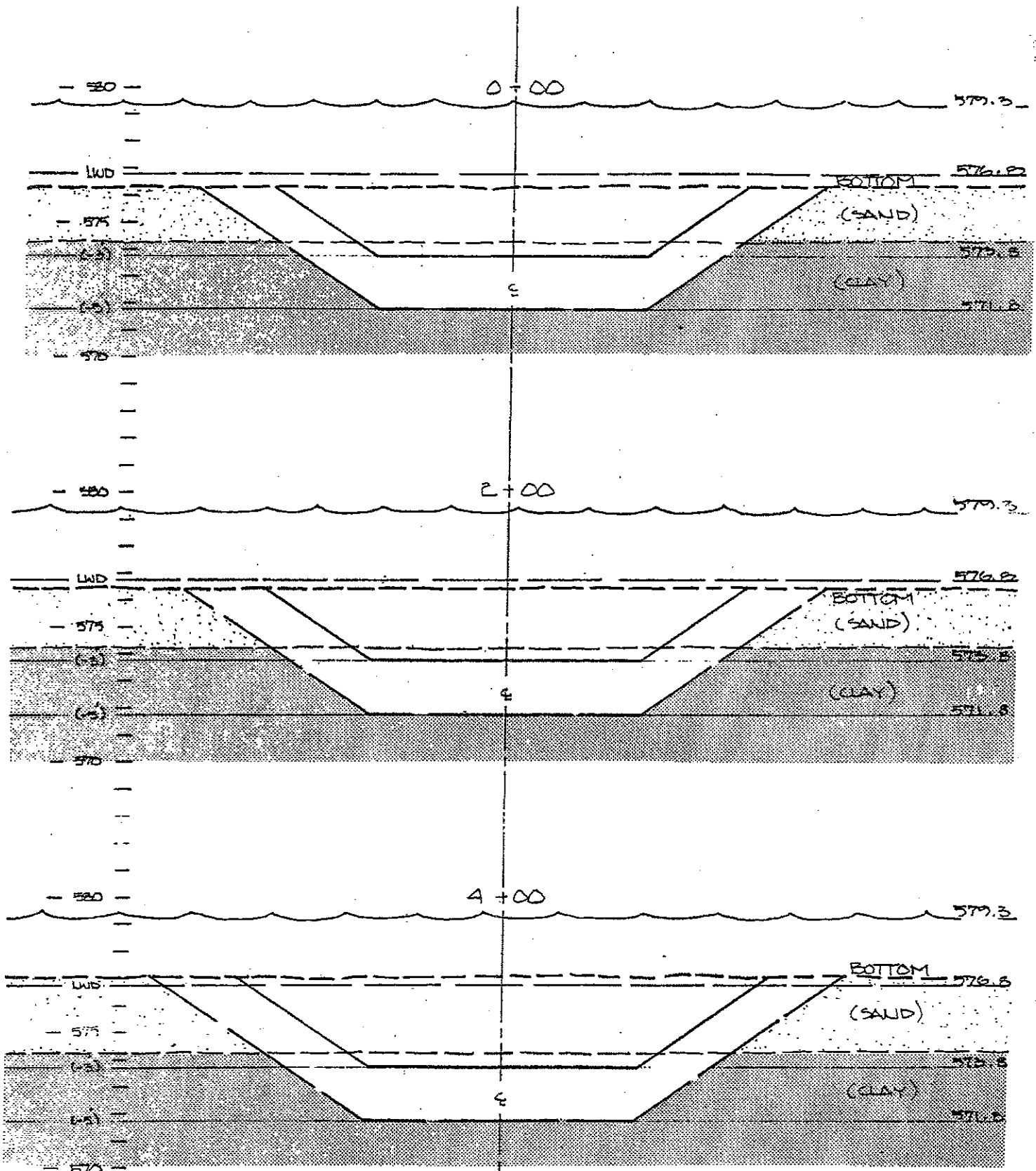
PROBINGS - FLION

WATER SURFACE EL. 579.1 IGLD ON 8/11/82

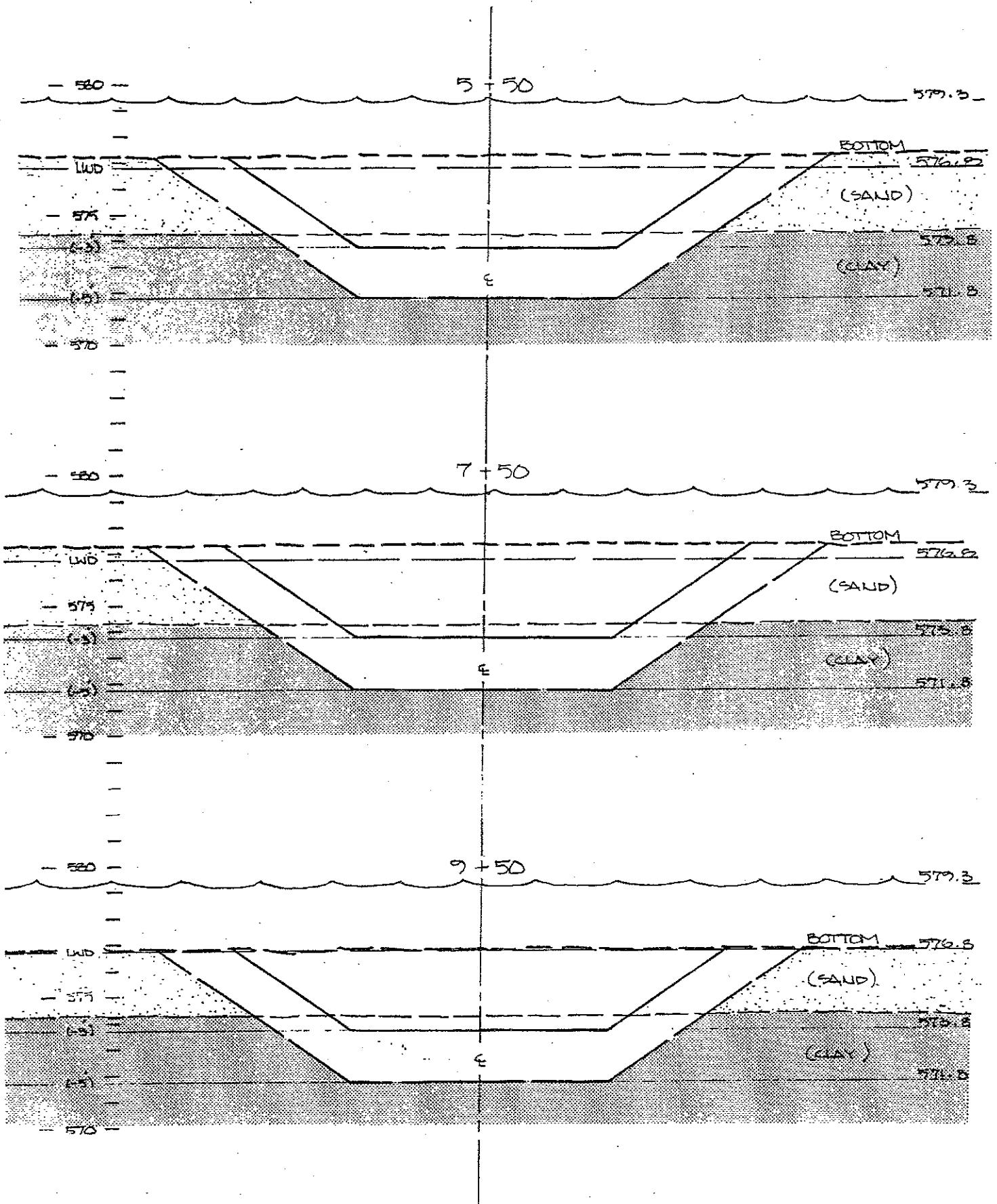
NOTE - BOTTOM CONDITIONS DETERMINED USING PEAT ROD

<u>STATION</u>	<u>SOUNDING</u>	<u>BOTTOM</u>	<u>COMMENTS</u>
5 + 50	0.0' - 2.0'	WATER	
	2.0' - 5.0'	SAND	
	5.0' +	CLAY W/SM. STONES	REFUSAL AT 5.0'
7 + 50	0.0' - 2.5'	WATER	
	2.5' - 5.0'	SAND	
	5.0' +	CLAY W/SM. STONES	REFUSAL AT 5.0'
9 + 50	0.0' - 3.0'	WATER	
	3.0' - 5.0'	SAND	
	5.0' +	CLAY W/SM. STONES	REFUSAL AT 5.0'

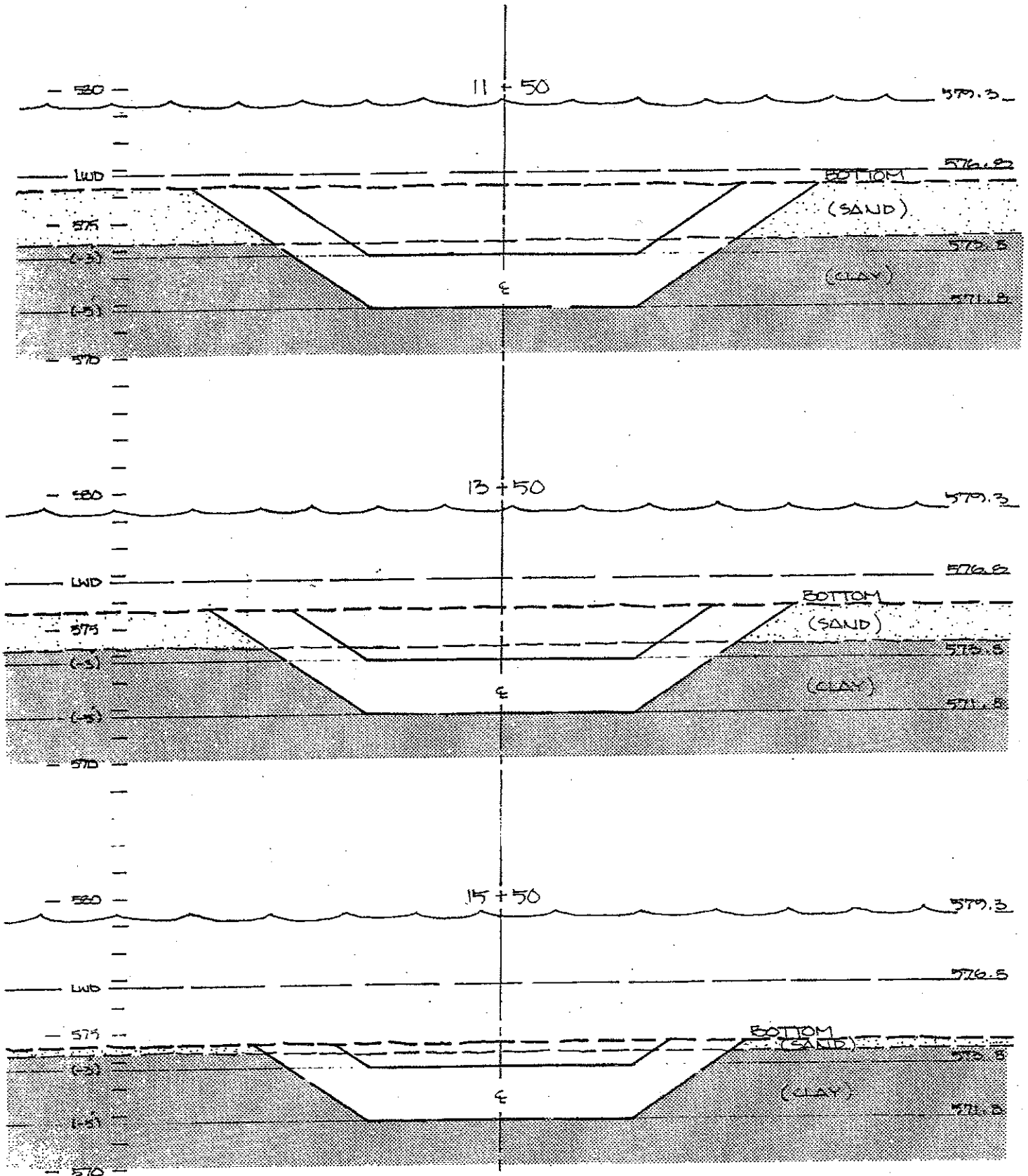
FILION ROAD



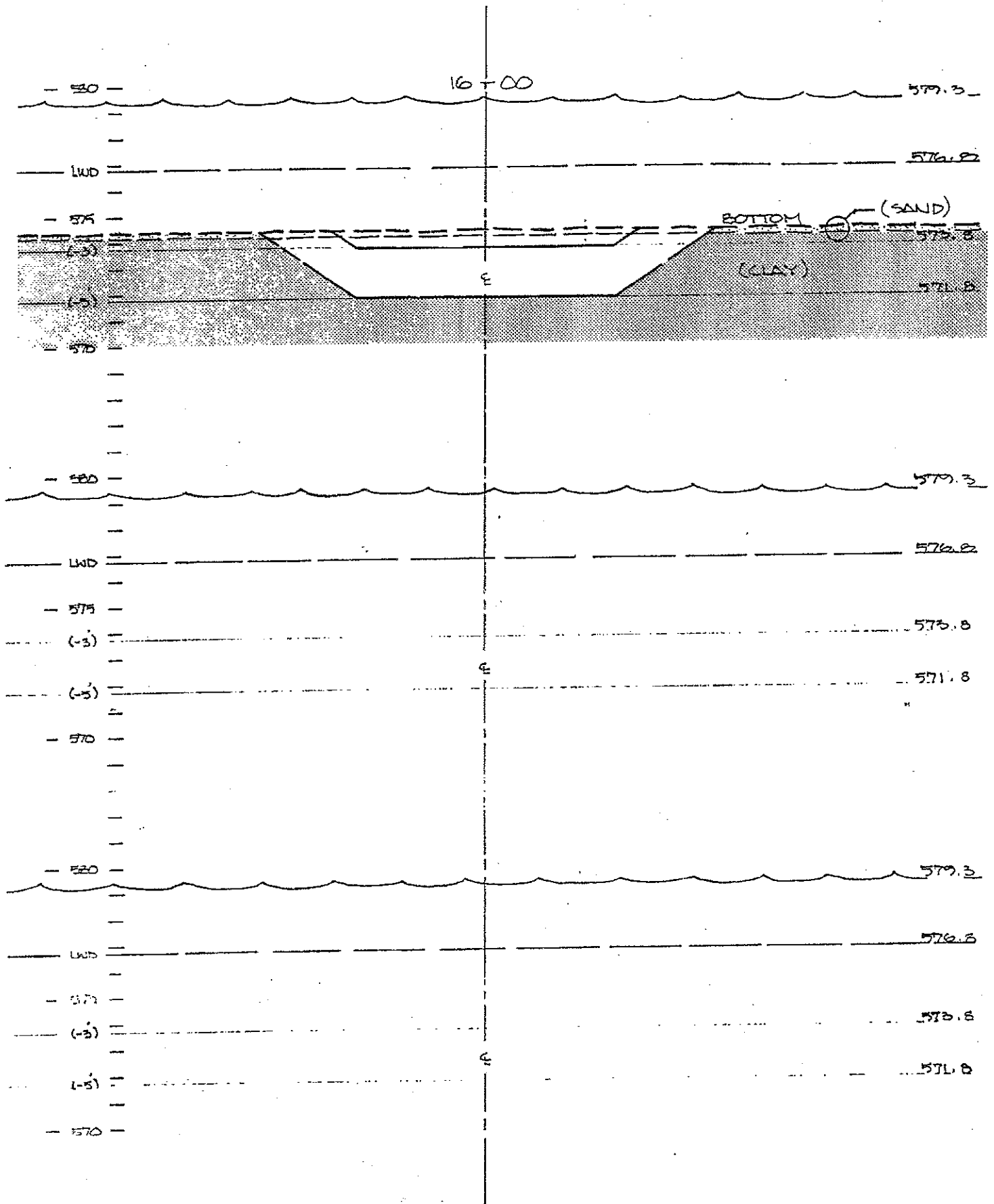
FILION ROAD



FILION ROAD



FILION ROAD



EARTHWORK - FILLION

(40' WIDE TOE OF CHANNEL 3.0' BELOW LWD)

AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

STATION	AREA	STATION	AREA	DISTANCE	VOLUME (CU. YD.)
0 + 00	124	2 + 00	129	200	937
2 + 00	129	4 + 00	170	"	1107
4 + 00	170	5 + 50	183	150	980
5 + 50	183	7 + 50	188	200	1374
7 + 50	188	9 + 50	160	"	1288
9 + 50	160	11 + 50	151	"	1151
11 + 50	151	13 + 50	92	"	900
13 + 50	92	15 + 50	38	"	481
15 + 50	38	16 + 00	29	50	62
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—
— + —	—	— + —	—	—	—

TOTAL DREDGING TO 3.0' BELOW LWD 8,300 CU. YD.

[7,050 CY SAND
1,250 CY CLAY]

EARTHWORK - FILION

(40' WIDE TOE OF CHANNEL 3.0' BELOW LWD)

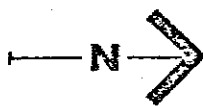
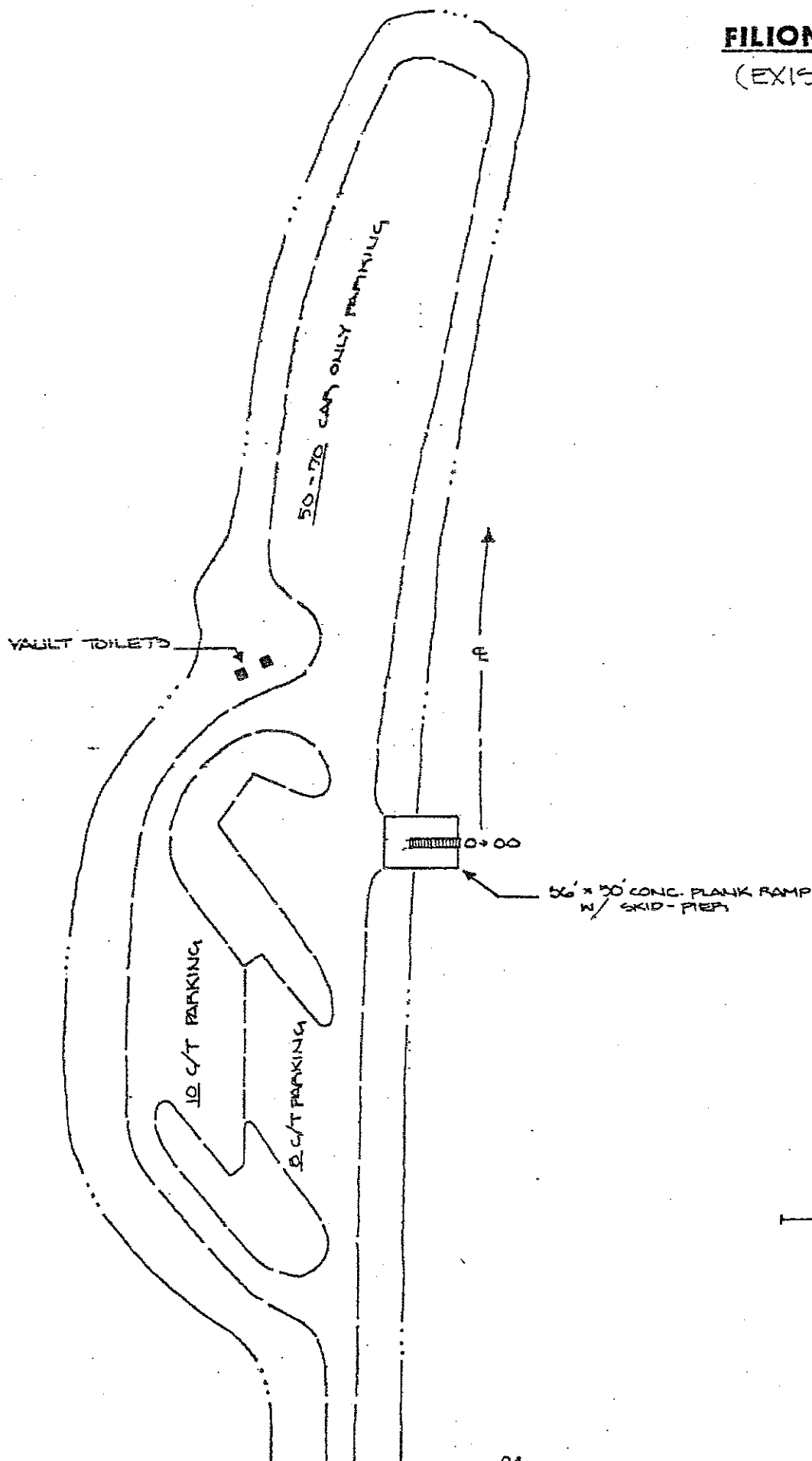
AVERAGE END METHOD : $[A_1 + A_2] / 2 \times D / 27 = \text{VOLUME IN CUBIC YARDS}$

[illegible]

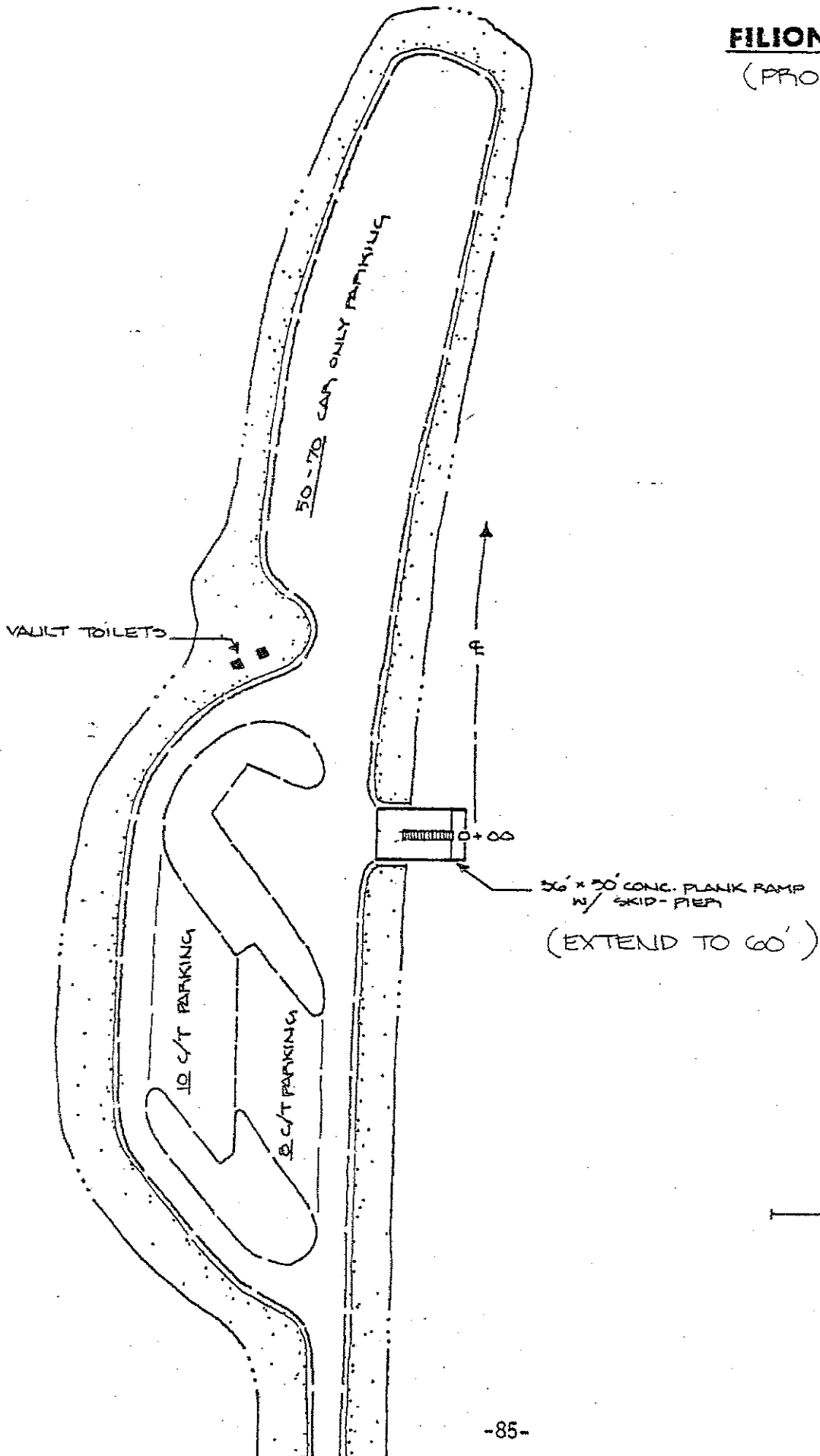
TOTAL DREDGING TO 5.0 BELOW LWD 15,800 CU. YD.

<u>8,700 CY</u>	SAND
<u>7,100 CY</u>	CLAY

FILION ROAD
(EXISTING)



FILION ROAD
(PROPOSED)



QUANTITY / COST ESTIMATE

FILION ROAD

WORK BY CONTRACT - CHANNEL

. DREDGE, WASTE OFF SITE	8,300 CY @ \$7.00	\$58,100
	10% CONTINGENCY...	<u>5,810</u>
	SUB-TOTAL	\$63,910

WORK BY STATE - EXTEND RAMP

. EXTEND 36'x50' RAMP TO 36'x60'	LUMP SUM	2,000
. CHANNEL MARKERS	LUMP SUM	1,600
. MOBILIZATION	LUMP SUM	<u>1,500</u>
		5,100
	10% CONTINGENCY...	<u>510</u>
	SUB-TOTAL	\$5,610

TOTAL PROJECT COST \$ 69,520

[NOTE... TO DREDGE CHANNEL TO 5.0' BELOW LOW WATER
DATUM ADD \$ 52,500 TO THE TOTAL PROJECT COST]